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24.5.22

The Journal of the Department of Agriculture of Victoria, Australia.

May, 1922.

PRINCIPAL CONTENTS

Crop and Fallow Competitions

Weeds and Their Eradication

Packing of Fruit

Stock Breeding

Registration of Stallions

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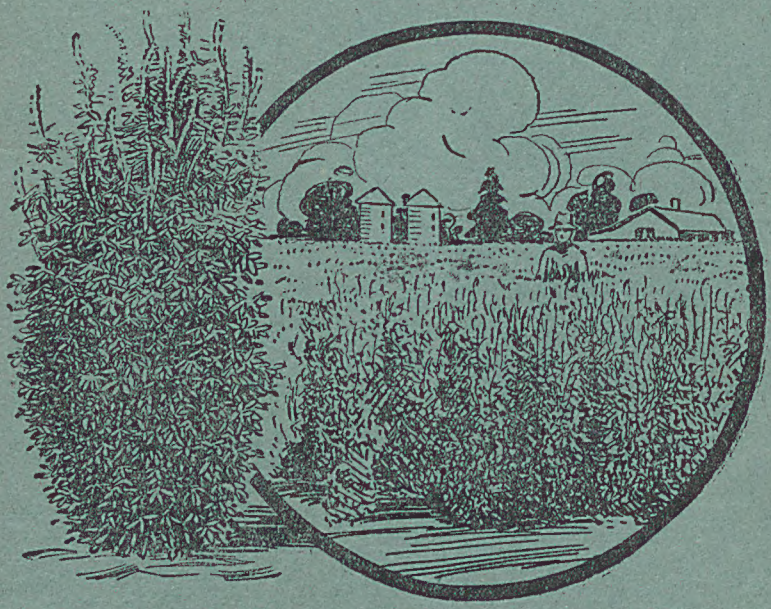

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OF

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VICTORIA, AUSTRALIA.

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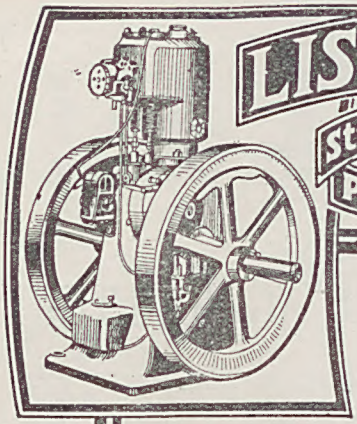

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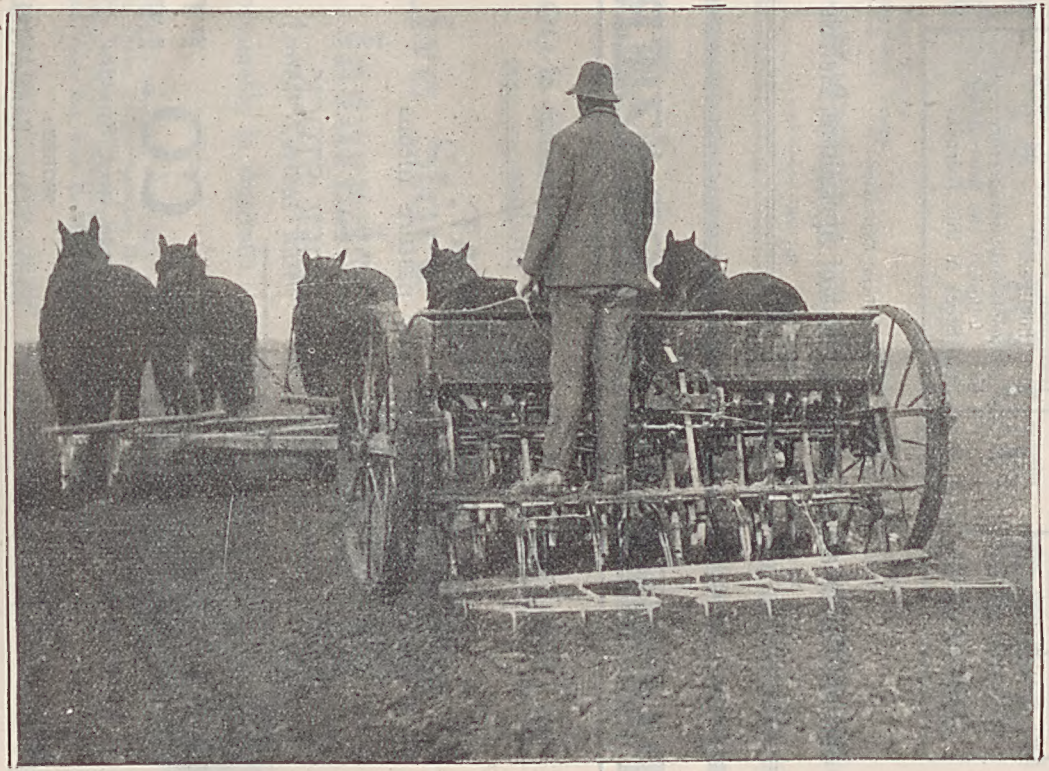

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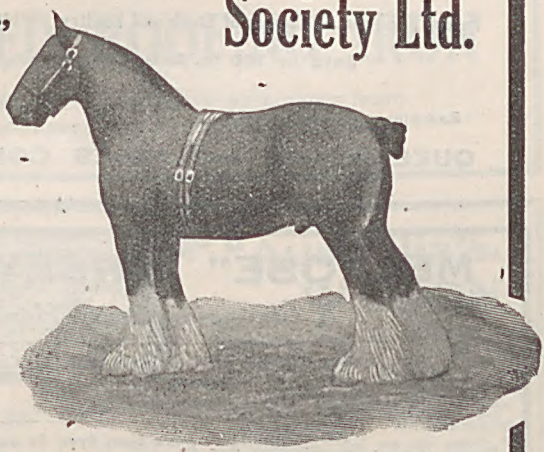

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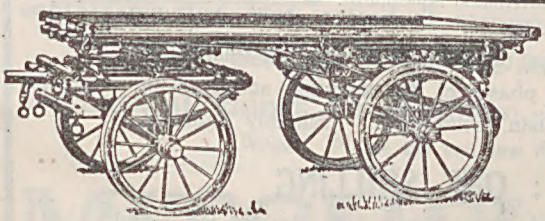

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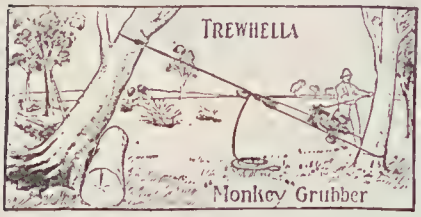

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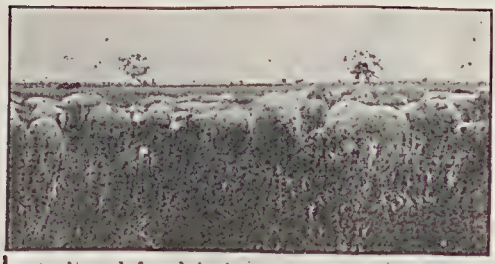

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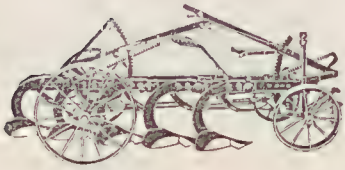

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Department of Agriculture

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VICTORIA.

Vol. XX. May, 1922. Part 5.

STOCK BREEDING.*

HINTS TO BEGINNERS.

By J. S. McFadzean, Senior Dairy Supervisor.

Value of Pure Breeding.

To increase the productiveness of the farm should be the principal aim of every man on the land. Nearly every farmer is a raiser of stock of some variety; and stock and stock products constitute a very large proportion of agricultural production. Higher-priced land, higher rates of interest, higher cost of living, and higher-priced labour make it most essential that everything possible must be done to increase the acre production, in order to show a profit on the work of the farm. Well-bred stock cost no more to feed and care for than inferior animals, but they bring in much more money. Well-bred sheep cut more wool and make better mutton than those of mixed breeding. A herd of pure-bred cattle will bring in better returns than cross-breds, whether for beef or dairy produce. In fact, for every utility a more even quality and more remunerative class of stock is obtainable by pure breeding than by crossing. If none but pure-bred sires were used in every line of stock-breeding, the acre production of every farm would be greatly increased; therefore, all matings made should be on the line of preserving purity of blood rather than cross-breeding.

Breed Spoiling.

Every farmer has not the ambition to become a breeder of stud stock. Very few indeed have that natural aptitude for the work which is essential to success; but this is no reason why those who are not stud breeders should persistently spoil the work of those who are. Australia possesses some of the most able stock-breeders in the world, who have done much to improve the breeds they are working with;

* Paper read at the Annual Convention of the Chamber of Agriculture, held at Horsham, 6th April, 1922.

but they are unfortunately surrounded by thousands of other stock-raisers who, by crossing and mixing up of both strains and breeds, are keeping the general quality of farm animals down to a very low level.

An Unwarranted Prejudice.

Carelessness, want of thought, and want of knowledge all contribute to this unfortunate condition in agriculture; but an unaccountable prejudice against close breeding is responsible for the great amount of cross-breeding that is done. That such prejudice is able to exist is due to the fact that many people will accept the questionable statements of others rather than the definite evidence by which they are surrounded. The plain fact is that all good quality which is present in domestic stock has been fixed there by close breeding, and all deterioration has resulted from indiscriminate crossing. There has, however, of late years, been a gradual change in regard to this subject in the minds of stock raisers. The advantages of higher grade animals are becoming more widely recognised each year, and more pure sires are being used. The younger generation of farmers include a larger percentage of breeders of pure stock than were to be found thirty years ago; but the prejudice against close breeding is still sufficiently strong and widespread to seriously interfere with progress; and, until that is changed, advancement in stock raising will not be general.

Blood Relationship Essential.

The hackneyed phrase, "Like produces like," is used by almost every one who endeavours to explain the laws of breeding; and is intended to convey the idea that the parent stock must have characteristics in common, if similar features are to be reproduced in the progeny. But most of those who use the term overlook the fact that a likeness such as is essential to this reproduction does not often exist between a male and female unless they are related in some way. A true likeness usually indicates blood relationship. In very rare instances would the direct offspring be found to reproduce features which the parents had in common, unless blood relationship existed between them.

Close Breeding in Nature.

Those who declaim against close breeding base their whole opposition to it on the grounds that it leads to constitutional weakness; yet all round us in nature close breeding is the rule, and has been the rule for all time. Every variety and sub-variety of animal, bird, reptile, or insect breeds close, otherwise they would not exist in varieties as we find them. Cross-breeding is not followed in nature; and no line of study on any species of stock can be carried on without accepting the fact that it owes its existence solely to close mating.

An Historical Example.

The earliest records of stock breeding furnish evidence that this was recognised when our present breeds of domestic cattle were being perfected. The history of the British Shorthorn shows that the perfection of that breed in the year 1810 was the bull "Comet." This bull resulted from the successive matings of first the bull "Bolingbroke" with the cow "Phœnix," which were both sired by "Foljambe"; then their son "Favourite" was mated back to his dam "Phœnix," and the heifer "Young Phœnix" resulted; and "Comet" was a calf from

"Young Phœnix" by her own sire "Favourite." This bull was sold for 1,000 guineas, and is one of the foundation stock of the present-day Shorthorn. That this was not haphazard mating is seen from the mention that the Collings Brothers, who bred "Comet" and many other high class Shorthorns, learned their business from the older breeder, Robert Bakewell, whose name is honoured as one of the founders of both Shorthorn cattle and British long-wool sheep. But it should not require any modern evidence to convince one who gives this subject serious thought that it would be impossible for any breed of animal to have been perfected without close breeding; and it follows that what will make a breed cannot be considered as tending to destroy it. Further, we come at once back to the fact that all cross-breeding which has been carried out by thousands of stock raisers since the time of Collings Brothers has produced nothing but inferior stock.

Scrutiny of the pedigree of the present day thorough-bred horse also brings overwhelming evidence of the success of close breeding; for in speed and stamina these stock give no suggestion of deterioration. Pedigrees of pure-bred sheep and dairy cattle also show that perfection in the flocks and herds of to-day has been maintained by close breeding —the whole of the evidence on this subject being strong in support of preserving a close blood relationship, and against cross-breeding.

Grading Up.

This brings us back to where mention was made of the widespread loss which has resulted from cross-breeding. Bulls of unknown breeding —the outcome of repeated indiscriminate crosses of various breeds—are being used by many people who raise stock; and the progeny are invariably a grade worse than the parents. Where pure-bred sires are used the progeny shows improvement. Where pure-bred sires of one strain only are used successively the improvement is still more marked. Still further progress is made where there is rigid selection of the females for each year's matings; and when such selection is followed by the breeding of an improved sire back to his own progeny the offspring more quickly shows the desired quality.

Constitutional Fitness.

The one thing which has to be borne in mind is that close breeding is not a system in itself. In nature close breeding is always accompanied by natural selection of the parent stock on the basis of stamina. Such selection is made as the result of fighting amongst the males at the mating season; and through all weakly animals succumbing to the stress of seasons, or the attacks of other animals or reptiles which are natural enemies of their species. Nature allows for selection by strength of constitution; and selection must be fully as rigid in all stock-breeding work by man. A weakling or faulty animal must not be used, or the weakness or fault will be intensified in the progeny by close breeding, just as strength and soundness is similarly reproduced. Close breeding to be fully satisfactory must always be accompanied by judicious selection on soundness of constitution.

Aptitude for the Work.

No study of systems of breeding will, however, make into successful stud breeders those who have not the natural aptitude for the work.

Unless the farmer is fortunate enough to be born with the faculty of discriminating closely in regard to excellence in high-class animals, he will be well advised not to attempt special stud breeding; but to content himself by working under the advice of some one whose ability as a breeder has been proved, and who will direct as to both culling and mating. Many people who are not capable of doing this work themselves are most diffident in acknowledging it, and they lose money in consequence. Natural aptitude combined with early training and experience qualifies for this work of stock selection, just as experts are made in any other profession; and those less fortunate should not hesitate to purchase their advice exactly as they would on a subject of law or medicine. The successful stock-breeder is the one most competent to be the adviser of others; and the latter would profit most by the arrangement.

Standard Type the Basis.

In all matings the basis of selection should be on standard show type. Every breed which has any claim to popularity has been developed for utility purposes, and, in the breeding of these, symmetry and beauty of outline as well as soundness of constitution have been attained. The result, as shown in the high-class animals of each breed, is thus the work of several generations of breeders, each following up and improving where possible on the work of those preceding; and all stock raisers should aim at maintaining those lines of excellence. In the perfection of symmetry of outline there has been no loss of utility quality; but rather there has been definite gain almost everywhere. More even production (and on a higher grade) is now obtainable from pure-bred stock than at any former period, and no better reason is required for the maintenance of standard type.

Exclusive Strain.

One thing, however, must be borne in mind by all those who raise stock, and this is that many strains of breeds are almost as distinct from others as though they were separate breeds; and, therefore, the crossing of these may give very unsatisfactory results. Where a strain of any breed has been established over a number of years a blood relationship will exist amongst the stock which may not blend well with that of another strain which has kept equally distant throughout its several generations. For this reason it is advisable that the purchase of sires be made on one line of breeding; so that, by continuing the line established by the stud breeder, the farmer or grazier may participate in whatever good results the breeder obtains.

How Best to Work.

In conclusion, pure blood lines make for perfection in stock. The repeated mating of pure sires to cross-bred or grade stock will most quickly improve the quality of these latter when the sires used in succession are related. The mating of a selected sire to selected females of his own progeny is more certain to be beneficial than otherwise. The mixing of breeds is a destructive policy; while the crossing of strains should only be attempted under the guidance of expert advice. Increased acre production from stock raising is certain to result from the consistent use of a line of pure-bred sires, and success will be most marked when following closely in the direction advocated.

STANDARDIZED PACKING FOR EXPORT, WITH READY RECKONER FOR THE PACKING SHED.

By Basil Krone, Orchard Supervision Branch.

The aim of this article is to put before Victorian fruit-growers and others interested in packing fruit for export a kind of Ready Reckoner which will enable them to ascertain readily which style of pack would be best to employ in varying circumstances.

The diagonal, or numerical check pack as it is sometimes called, is the standard pack for the Australian bushel dump export case, and is the one used in most packing sheds throughout Victoria. But such a big variation exists between packers, sometimes in the same shed, that perhaps, even though the same variety and grade of apples are being packed, it may happen when the cases are opened at a central market no two are the same.

This, of course, is not standardizing, and upon investigation it will be found that, while some of the packers are experienced and fully understand the system, others only partially understand it, and when nearing the top of the case they find that the fruit will not come to the correct height; then, perhaps, they place the apples in the last layer directly on top of the fruit in the layer beneath, which has not been properly packed, and this often results in a slack pack.

The aim of fruit-growers and co-operative sheds should be to have the same number of fruit in each case of a given size, so that one could say immediately he saw a case exactly how many apples it contained.

The Standard Diagonal (Cheek) Pack.

There are several systems of packing fruit, and each system is complete in itself; therefore it is not necessary to combine any of the systems to pack fruit. The system of diagonal cheek packing has been adopted in Australia for most of our fruits, such as apples, pears, peaches, plums, &c. Apart from the fact that the fruit is less liable to be bruised, this method adapts itself to our Australian dump export case more readily than other packs, and automatically insures that, no matter what the size or shape of the fruit may be, all can be packed to the correct height, and no two fruits will rest directly on top of each other in any direction, yet all will fit firmly and not be over-pressed or bruised. Should open spaces be desired to admit free circulation of air between each specimen in cool storage, this pack will readily lend itself to such a procedure. Further, from a selling or buying point of view, not only is the diagonal pack more attractive should the case be opened on the top or the side, but the buyer knows immediately how many apples are in the case. For instance, in purchasing a consignment of Jonathans (a medium-shaped apple) which has been properly packed, a buyer knows exactly how many apples he will receive, whether it be one or a thousand cases, and this should be so whether he buys from the north, south, east, or west of the State. For this reason, buyers are more anxious to purchase fruit in a standard pack than that packed in varying methods or without any method at all.

Fig. 1.—Wrapping Apples for Packing.

Fig. 2.—Beginning to Pack.

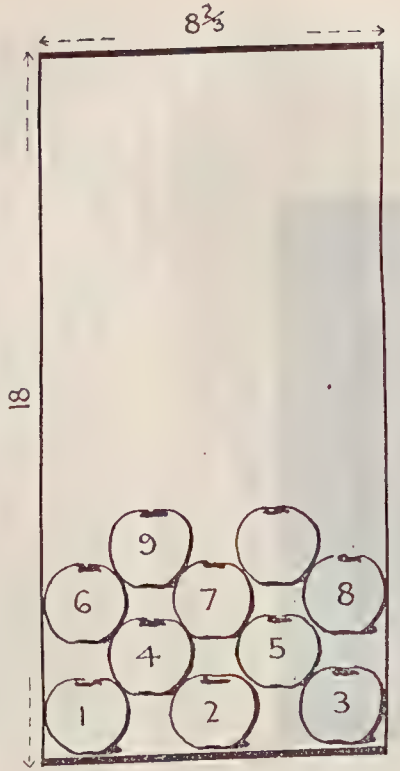


FIG. 3

How to commence bottom layer of 3–2 pack.

(Continue in this way till layer is finished.)

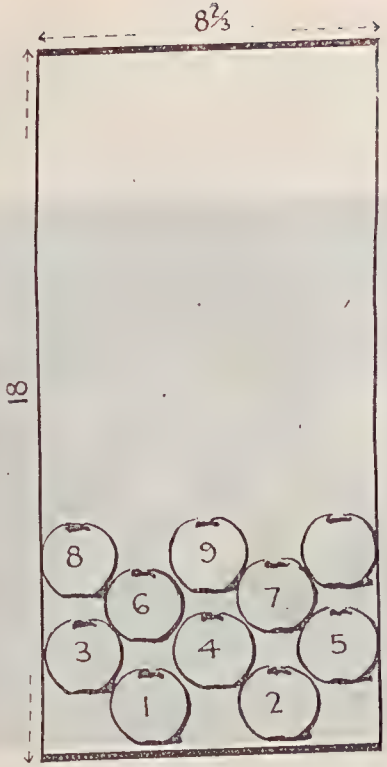


FIG. 4

How to commence each alternate layer of the 3–2 pack.

(Fruit placed in spaces of layer below.)

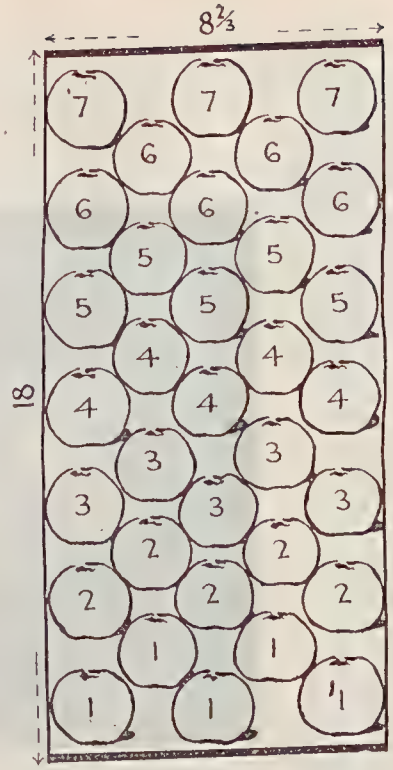


FIG. 5

3-2 pack and 7–6 layer. Total, 228 apples.

In all the States of the Commonwealth the diagonal pack has been adopted, but at times some packers have not understood the system completely, and consequently are unable to bring the fruit to the correct height in the case. To those who have not already adopted the standard pack, the proof that the diagonal system is the best is that almost all who have adopted the system have never reverted to the older methods.

Fig. 6.—The 3-2 Pack.

(This case was previously packed on the 2-2 system, and left a space between the upper layer and the top of the case. Packed on the 3-2 method the fruit came just to top of the case.)

In many of our packing sheds trouble has arisen in filling the cases to the correct height, some coming too low, resulting in a slack pack with consequent bruising of fruit while in course of transport; others are packed too high, which means over-pressed fruit, and, since the art of good packing is to be able to place all varieties, shapes, and sizes to the correct height in the case, special reference is made to the overcoming of this difficulty.

The Beginner Learning to Pack.

The packing of fruit for export is really a simple process, and almost any person can, with a little practice and instruction, become thoroughly acquainted with the necessary procedure for bringing the fruit to the correct height in the case. The learner should practise slowly on the first few cases of each size until he has a complete grip of the system, and soon he will be able to pack quite a reasonable number in a day, and every case will be neat and attractive.

The easiest way to explain the system is by diagrams, and several of these are to be found on subsequent pages.

At first, let us consider the grading of fruit into the following sizes:—2¼, 2½, 2¾, and 3 inches in diameter, which are to be packed into dump cases, the inside measurement of which should be 18 x 8⅔ x 14¼ (2,223 cubic inches). In packing the 2¼-in. size, the procedure is as follows:—First place a thin layer of wood wool or a corrugated strawboard in the bottom of the case to protect the fruit. Take a sheet of tissue paper in one hand and place an apple calyx end in the paper, folding the ends of the paper across the stalk and beneath on the lower cheek of the apple (the ends of the paper will serve as a pad for the fruit to rest on). (See Fig. 1 and Fig. 2.) Then place the fruit in the bottom of the case as shown in Fig. 3, and continue until the layer is finished. This is called the 3–2 pack on account of commencing with 3 apples, then 2, and again 3, and 2, and so on. It is very important that the second layer must rest in the spaces of the bottom layer and not directly on top of the fruit in it. Therefore, the second layer will commence with two apples instead of three, as in the first layer. How to commence the second and each alternate layer is illustrated in Fig. 4.

Fig. 5 shows the medium-shaped 2¼-in. apple on the 3-2 pack. It will be noticed in Fig. 6 that each apple is facing in a certain direction. The outside ones on the top row of this case were left unwrapped in order to show more clearly the position of each fruit. All the other apples in the case were facing the same way. This is one of the customs in packing apples for export. It has been recognised that an apple is harder round the calyz end than on the cheek. It is usual, therefore, to place each apple on an angle, in order that a portion of this harder part of the fruit will come in contact with the side of the case instead of the full cheek. Thus when cases are being stacked on their sides in railway trucks, boats, &c., the chance of bruising is minimized. For this reason the cheek pack is adopted in nearly all sheds in the Commonwealth, instead of the calyx or flat pack. In this latter pack, where the full cheek of the apple is exposed to the side of the case, if the side lathes have been cut too thin, which often happens, the fruit is very liable to be damaged.

All varieties and shapes of the smaller apples are packed on the 3–2 cheek pack. Fruit from 2½ to 3 inches in diameter are packed on what is known as the 2–2 cheek pack (Fig. 7). The method of placing the bottom layer can be seen at a glance. The second layer is shown in Fig. 8.

Fig. 9 will show how to count the layer of the 2–2 pack. Fig. 10 illustrates a case of 2¾-in. Jonathans—a medium-shaped apple—packed on this method. Both the lid and one side have been taken off, and

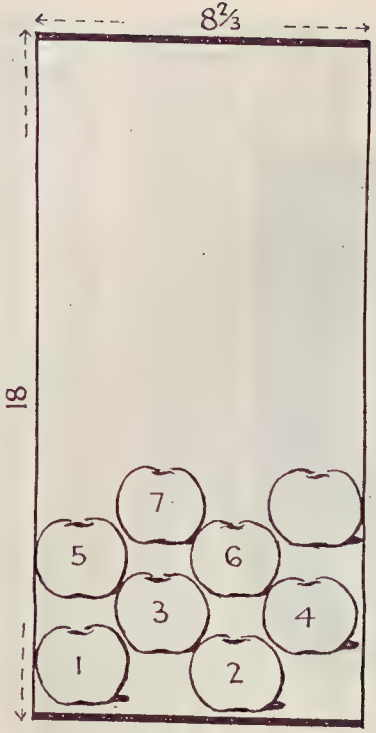


FIG. 7

How to commence the 2-2 pack.

(Continue in this way till layer is finished.)

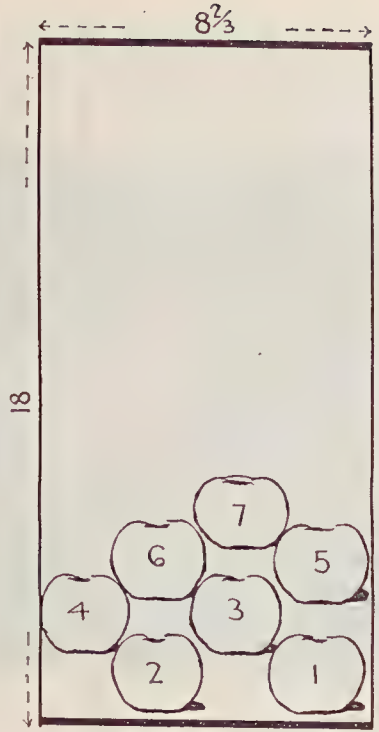


FIG. 8

How to commence second layer of 2-2 pack.

(Place fruit in spaces of layer below.)

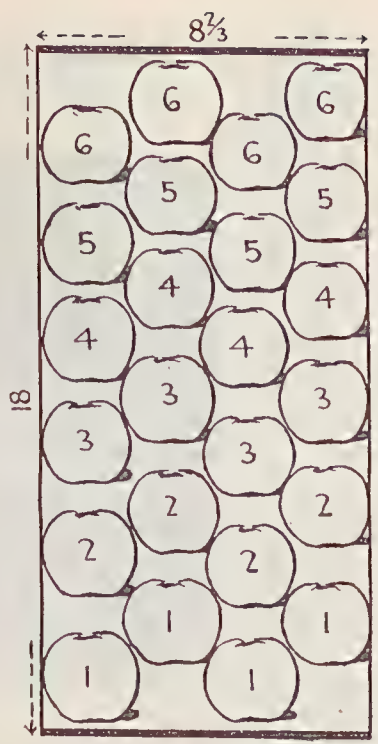


FIG. 9

2-2 pack and 6-6 layer. Total, 144 apples.

it can be clearly seen that no two fruits are resting on top of each other, and the diagonal system shows itself on the side as well as the top of the case.

Apples over the 3-in. grade (very large) will pack on the 2–1 pack (Fig. 11). It is very important that in every pack no two of the fruit will rest directly the one on top of the other, but each will have a space or pocket beneath it. It is well to mention here that any fruit large enough to pack on the 2–1 system is too large for export, and should be sold on local markets, as it does not keep as well as the smaller fruit, particularly if picked from young trees.

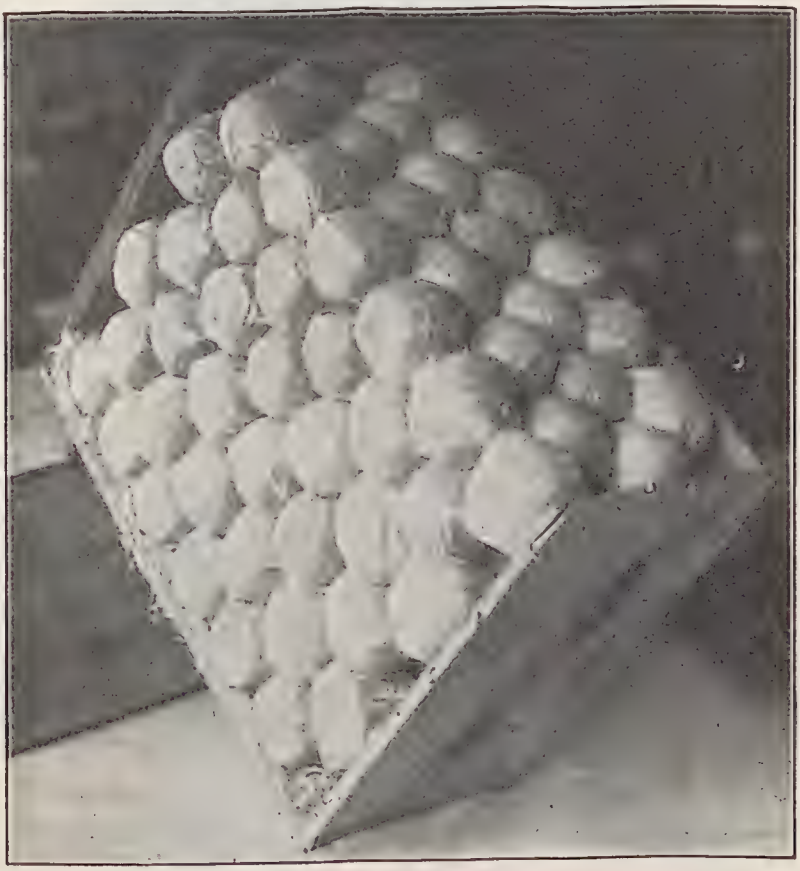


Fig. 10.—A Case of Jonathans Packed on the 2-2 System.

The art of packing a good case is to get all sizes and shapes to the correct height, and the beginner will almost certainly find that this cannot easily be done—the fruit will either be too high or too low. A form of Ready Reckoner has, therefore, been drawn up, which will be useful for the learner, and at times also to the experienced packer when commencing a new season.

The amount of space or size of pocket between each fruit in a layer will decide whether the top layer will be in correct position. If these spaces be large or small, the fruit will come high or low accordingly.

The Ready Reckoner indicates which packs to adopt for the various shapes and sizes. This may be thought unnecessary, but it will often be found of use. For instance, when packing Jonathan apples of a 2½-in. grade it may be these will pack very neatly on the 2–2 pack, but not reach the top of the case, yet not leave room for another layer. All 2–2 packs contain six layers, and all 3–2 packs contain seven layers (see Ready Reckoner); and, by packing the 2½-in. grade fruit on the 3–2 instead of 2–2 system, the size of the pockets or spaces will be made slightly larger, thus the extra layer, which is in all 3–2 packs, will come nicely to the top of the case.

Fig. 12 shows large 2½-in. grade Jonathans packed on the 3–2 instead of 2–2 system, which latter would have come too low when finished. Fig. 6 (page 264) shows a case of smaller fruit of the same grade, which likewise should be packed on the 3–2 system. The writer specially packed these two cases of the 2½-in. grade apples, as many packers have difficulty in bringing them high enough in the case, and many packs of this grade are found to be slack on arrival at their destination. It will be noted that both cases are packed on the 3–2 system, but one has the 5 x 5 layer, which means the case contains 175 apples, and the other the 6 x 5 layer, this case containing 193 apples. It is, of course, possible and quite correct to pack some shapes of 2½-in. grade on the 2–2 pack. The Ready Reckoner shows this.

It is the same with the 2–1 pack. If it comes too low, it should be altered to the 2–2 pack. Of course, only a certain number of fruits must be in each layer, otherwise the pockets or spaces may be too large or too small, and the fruit come too high or too low. The Ready Reckoner will show the number of apples to be put in each layer; and, if they are graded carefully, the packing will take care of itself.

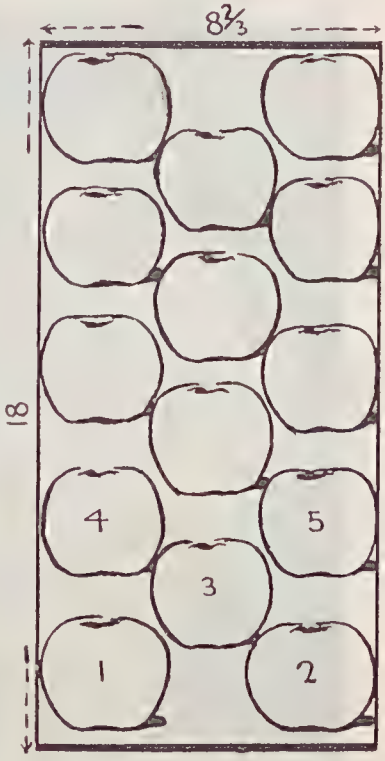


FIG. 11

The 2-1 Pack.

(Alternate layers rest in spaces of lower layers, as in other packs.)

Nailing Down.

Nailing the lid on the case is one of the most important operations, and it is a pity to see so often good fruit subjected to rough dumping on a hard floor in order to get the lid to lie flat.

If the grading be carefully done and the packing chart used, it will be found that the fruit will be firmly packed, and when the lid is on there will be only a very slight bulge (about ⅜ inch) top and bottom to allow for shrinkage. When nailing the lid on there should be little

or no dumping, and this can be managed by placing two pieces of 3-in. x 1-in. battens parallel on the floor and just far enough apart to allow the edges of the case to rest on them; the bottom of the case will then be clear of the floor, and the lid nailed on without dumping and with less bruising. A nailing-down press is used in America, but the use of battens as just suggested is quite effective. If long battens are used, several cases can be nailed down at a time. Fig. 13 shows the lid being placed on a case standing on battens.

Fig. 12.—Case of 2½-inch Jonathans Packed on the 3-2 System.

(If packed on the 2-2 method the fruit would not reach the top of case.)

When large numbers of cases have to be made or nailed down, the use of a wire-hair comb with long teeth sufficiently wide apart for the nails to fit between will be found of great assistance in picking up quantities of nails with their heads turned the one way, ready for nailing. An American nail stripper is obtainable for this purpose, but the hair comb is commonly used in Australia. A thin layer of wood wool or a corrugated cardboard should first be placed in the case before

the fruit is packed, and again on the top layer before the lid is nailed on; this protects the fruit from being cut by the lids and bottoms, especially if these have been cut in two pieces.

How to Use the Ready Reckoner.

The arrows in the Ready Reckoner point to packs by which most of our commercial varieties can be brought to the correct height; but, of course, with abnormally shaped ones, the less common packs may be found the most suitable. The most important act is to get the correct number of apples in the bottom layer (Fig. 5 and Fig. 9). These diagrams illustrate the 3–2 and 2–2 packs, which are packed in layers described as the 7 x 6 and 6 x 6 layers. Attention is particularly drawn

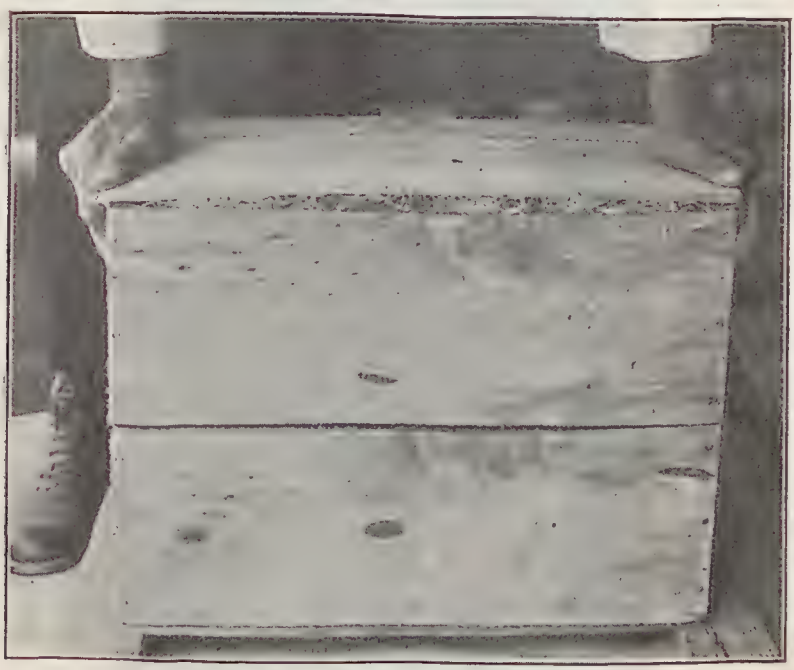


Fig. 13.—Lid being Placed on Case.

to the description of the layer as well as the pack, as everything depends on the layer in bringing the fruit up exactly to the top of the case.

When grading, most packers divide each grade into two, that is, they pack small 2¼ inch and large 2¼ inch, small 2½ inch and large 2½ inch, and so on, as a ¼-in. range is allowed between each size. For instance, a 2¼-in. apple would mean any size not less than 2¼ inches in diameter and not more than 2½ inches; 2½-in. grade would be from 2½ to 2¾ inches; and 2¾in. grade would be from 2¾ to 3 inches; above 3 inches and not more than 3¼ would be 3-in. grade.

To standardize the pack, all cases should contain the same number of apples for their respective sizes and grade, and, no matter whether one or 1,000,000 cases were opened, the number in each should correspond

READY RECKONER FOR THE PACKING SHED.

STANDARDIZED APPLE PACKING FOR EXPORT—DIAGONAL CHEEK SYSTEM.

Inside case measurement, 18 x $8\frac{2}{3}$ x $14\frac{1}{4}$ = 2,223 cub. inches.

This Ready Reckoner might be copied on a card and hung in a conspicuous place in the packing shed in order that reference could be made to it when necessary.

The Apples must fit firmly and no two fruits rest directly on top of each other.

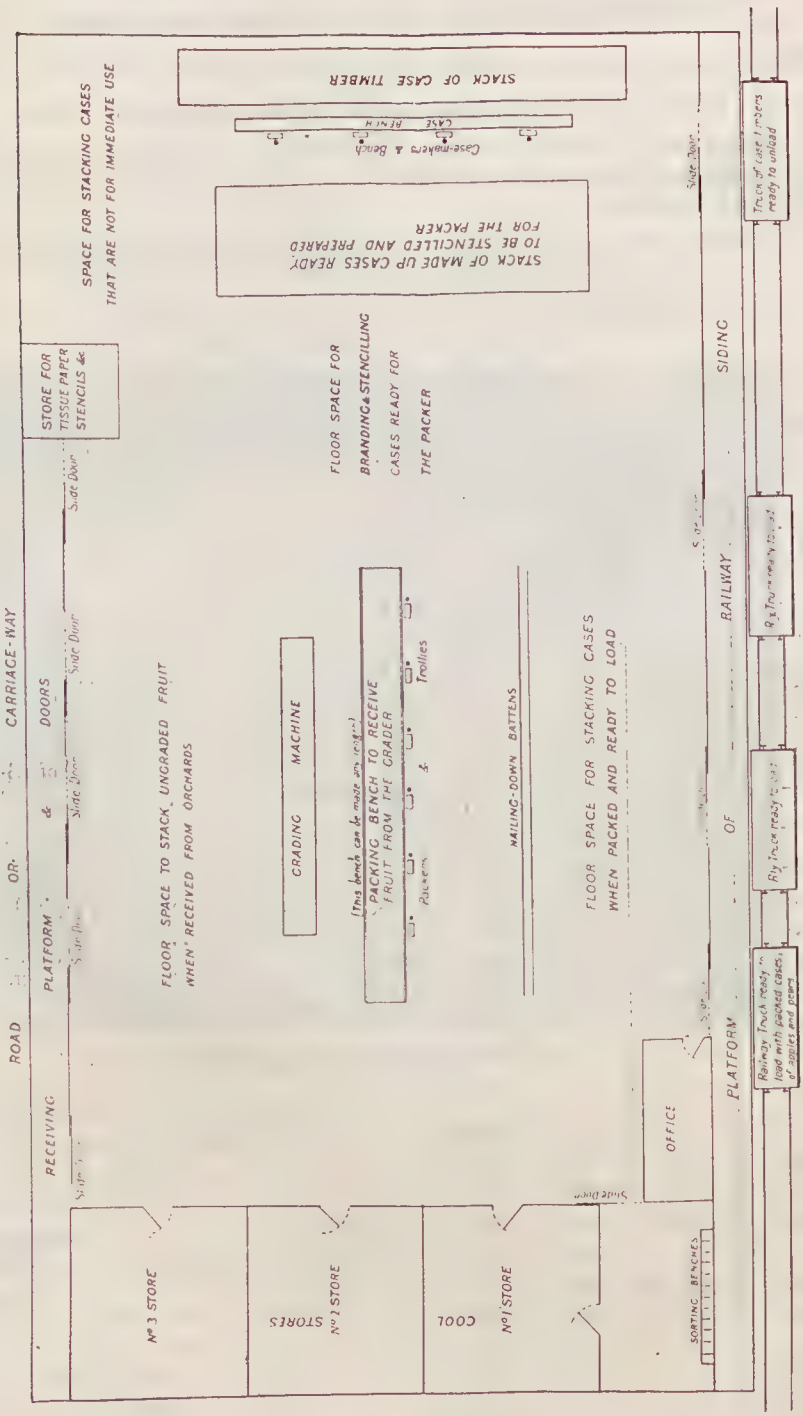
The Arrows indicate the packs mostly used in packing sheds.

All 3—2 packs contain 7 layers.
„ 2—2 „ „ 6 „
„ 2—1 „ „ 5 „

Name of Pack.	Description of Layer.	Number of Layers in Case.	Total Number of Apples in Case.	
3–2	9 x 8	7	298	
3–2	8 x 8	7	280	
3–2	8 x 7	7	263	
3–2	7 x 7	7	245	←Small or flat shape .. .. } of $2\frac{1}{4}$-inch grade
3–2	7 x 6	7	228	←Medium shape .. .. } of $2\frac{1}{4}$-inch grade
3–2	6 x 6	7	210	←Pearmain or long shape or large size } of $2\frac{1}{4}$-inch grade
3–2	6 x 5	7	193	←Small or flat shape .. .. } of $2\frac{1}{2}$-inch grade
3–2	5 x 5	7	175	←Medium shape .. .. } of $2\frac{1}{2}$-inch grade
2–2	8 x 7	6	180	
2–2	7 x 7	6	168	←Large flat shape (seldom used) of $2\frac{1}{2}$-inch grade
2–2	7 x 6	6	156	←Small or flat shape .. .. } of $2\frac{3}{4}$-inch grade
2–2	6 x 6	6	144	←Medium shape .. .. } of $2\frac{3}{4}$-inch grade
2–2	6 x 5	6	132	←Pearmain or long shape or large } of $2\frac{3}{4}$-inch grade
2–2	5 x 5	6	120	
2–2	5 x 4	6	108	←Small or flat shape of 3-inch grade
2–2	4 x 4	6	96	
2–1	7 x 7	5	105	
2–1	7 x 6	5	98	
2–1	6 x 6	5	90	←Medium shape .. .. } of 3-inch grade
2–1	6 x 5	5	83	←Pearmain or long shape or large } of 3-inch grade
2–1	5 x 5	5	75	
2–1	5 x 4	5	68	
2–1	4 x 4	5	60	
2–1	4 x 3	5	53	
2–1	3 x 3	5	45	

GROUND PLAN OF

PACKING & CASE-MAKING SHED


ROAD OR CARRIAGE-WAY
RECEIVING PLATFORM & DOORS
STORE FOR TISSUE PAPER STENCILS &c.
SPACE FOR STACKING CASES THAT ARE NOT FOR IMMEDIATE USE
FLOOR SPACE TO STACK UNGRADED FRUIT WHEN RECEIVED FROM ORCHARDS
GRADING MACHINE
(This bench can be made any length)
PACKING BENCH TO RECEIVE FRUIT FROM THE GRADER
Packers
Trolleys
FLOOR SPACE FOR BRANDING & STENCILLING CASES READY FOR THE PACKER
STACK OF MADE UP CASES READY TO BE STENCILLED AND PREPARED FOR THE PACKER
Case-maker's Bench
CASE BRANCH
STACK OF CASE TIMBER
NAILING-DOWN BATTENS
FLOOR SPACE FOR STACKING CASES WHEN PACKED AND READY TO LOAD
Side Door
RAILWAY SIDING
Track of case timbers ready to unload
Ry truck ready to load
Railway truck ready to load with packed cases of apples and pears
PLATFORM OF RAILWAY
OFFICE
SORTING BENCHES
No 3 STORE
No 2 STORE
No 1 STORE
COOL

(This plan is not drawn to any scale.)

Cases, Packing Paper, Branding, &c.

CASES.

Too much cannot be said about the varying thicknesses in which some of our case timber is cut. Usually cases are a great deal too thin and flimsy; the side lathes have in many instances spaces between them much too wide, and, if cut at all thin, these warp and the fruit suffers. Many complaints come from overseas about the flimsy character of our hardwood cases. The side lathes should not be less than $\frac{3}{8}$ inch in thickness, and $\frac{1}{8}$ inch space between each lath is ample for apple cases. The lids and bottoms should not be less than $\frac{1}{4}$ inch in thickness. A well cut case should be strong enough to hold an ordinary person standing on it when placed on its side empty, and the boards should not bulge in.

Case ends should be cut $\frac{3}{4}$ x $14\frac{1}{4}$ x a little over $8\frac{2}{3}$ to allow for shrinkage.

Side lathes should be cut $\frac{3}{8}$ x $4\frac{11}{16}$ x $19\frac{1}{2}$.

Lids and bottoms (in one piece, if possible), $\frac{1}{4}$ x $8\frac{2}{3}$ x $19\frac{1}{2}$.

The inside measurement of this case when made up will be 18 x $8\frac{2}{3}$ x $14\frac{1}{4}$, and contain 2,223 cubic inches.

FRUIT CASE DIMENSIONS.

Australian dump bushel, inside measurement, 18 x $8\frac{2}{3}$ x $14\frac{1}{4}$ = 2,223 cubic inches (export trade).

Australian dump half-bushel, inside measurement, 18 x $8\frac{2}{3}$ x $7\frac{1}{8}$ = $1{,}111\frac{1}{2}$ cubic inches (export trade).

Australian half-bushel, grape, inside measurement, 18 x $11\frac{3}{4}$ x $5\frac{1}{4}$ = 1,110 cubic inches (export trade).

Australian flat bushel, inside measurement, clear of division, 26 x 6 x $14\frac{1}{4}$ = 2,223 cubic inches (Inter-State trade).

Australian flat half-bushel, inside measurement, clear of division, 26 x 6 x $7\frac{1}{8}$ = $1{,}111\frac{1}{2}$ cubic inches (Inter-State trade).

Australian orange export, inside measurement, clear of division, $24\frac{3}{4}$ x 12 x 12 = 3,564 cubic inches (export trade).

Australian pear trays, inside measurement, 18 x $3\frac{1}{4}$ x $14\frac{1}{4}$ = $833\frac{5}{8}$ cubic inches (export trade).

Australian pear trays, 18 x $2\frac{7}{8}$ x $14\frac{1}{4}$ = $737\frac{7}{16}$ cubic inches (export trade).

TISSUE PAPER.

All fruit for export should be wrapped in tissue paper. This acts as a cushion, and holds the fruit nice and snug, absorbs surplus moisture, prevents disease and decay spreading from one fruit to another, and, in addition, makes the pack more attractive. Some reams of tissue papers of varying sizes have been counted, and average as follows (this will give the grower an idea of how many apples or cases a ream will pack):—

Size.	Papers per Ream.	Depth of Bundle or Ream.	——
8 x 8	500 sheets	$\frac{3}{4}$ of an inch	Approx. 250 sheets of 10 x 10 tissue per lb. and 370 of 8 x 8.
9 x 9	2,800 ,,	4 inches	
10 x 10	3,000 ,,	$4\frac{1}{2}$,,	

Nails.

Generally, 1¼-in. 14 or 15 gauge nails are used when making cases. Sometimes 1½-in. nails are used, but the 1¼-in. 15-gauge will be found the most economical.

For 1,000 dump cases, approximately 1 cwt. of 1¼-in. 15-gauge nails will be required.

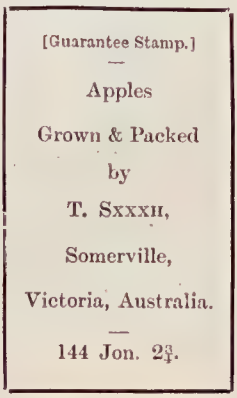
For 950 flat bushel cases, approximately 1 cwt. of 1¼-in. 15-gauge nails will be required.

For 1,400 56-lb. dried fruit boxes, approximately 1 cwt. of 1¼-in. 15-gauge nails will be required.

Branding and Stencilling.

All cases should bear a record of the quantity contained—"One Imperial Bushel" or "One-half Imperial Bushel," and so on. On one end should be shown the name and address or registered brand of the grower or the central packing shed, and the variety and size of the fruit, and, if desired, also the number. On the other end, the name or commercial brand of the firm to which the fruit is consigned, as well as the port of destination, should be stencilled. The name and address of the maker of the case should also be shown on the case in letters of ¼ inch or so.

Specimen ends of branded cases are shown hereunder:—



Before cases are stencilled, all those that have shrunk should be carefully picked out. These will be useful for picking and storing purposes.

Packing Pears for Export in half-bushel Dump.

The diagrams (Figs. 14 and 14A) will show how pears should be packed on trays according to their size. A layer of wood wool is placed in each tray before packing, and a layer on top of the fruit. The three trays are then stacked together, the bottom of one tray forming the lid for the tray beneath. The top tray has the usual lids nailed on. The package is then cleated or hoop-ironed together to form a dump case.

Picking and Handling Peaches for Cool Storage or Oversea Markets.

When picking peaches that have to be cool-stored or sent overseas, the fruit should be fully developed, but very hard, and showing some colour. Instead of picking into bags or buckets in the usual way, it is suggested that they be picked on to convenient sized trays which have been padded with bags or sacking. The trays can then be placed side by side on the bench in the packing shed, and the peaches packed direct into the cases; this will save much tipping out and unnecessary handling of the fruit. The palm of the hand should hold the peach when picking; the fingers must not press the fruit in any way.

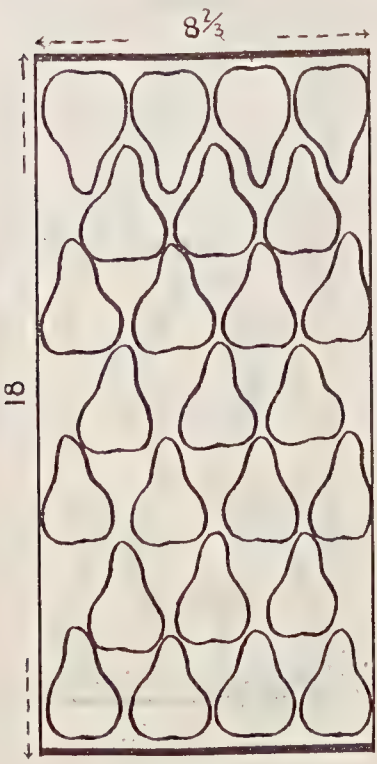


Fig. 14

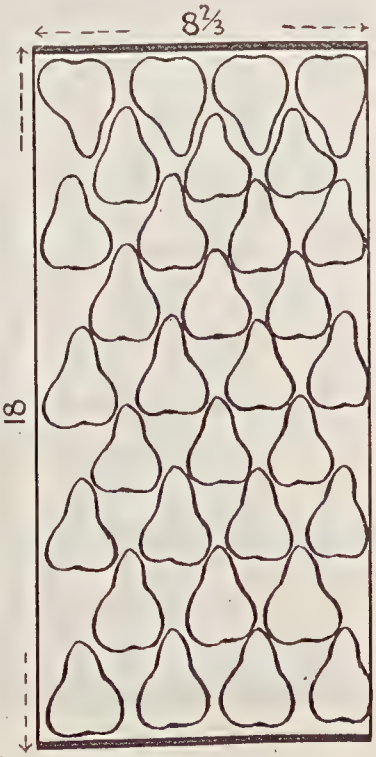


Fig. 14A

Pears Packed in Trays.

Should any grower wish to forward peaches in the half-dump cases for cool storage, as has been done during this season, the following table will be found useful in packing. With peaches for export I would recommend that two sheets of tissue paper be placed round each peach.

On account of the popularity of the half-dump case this season with many growers who exported pears in them instead of trays, a separate

chart has been drawn up to guide the packer in getting the fruit up to the right height. As the half-dump is exactly half the depth of the bushel pump, one would naturally think, if the latter case contained a certain number of fruits, the half dump would contain half that number, but this is not so. Therefore, a separate Ready Reckoner has been worked out for those using the half-dump. Pears are packed on the diagonal, in the same way as apples, except that the stalks should all face one direction; the last pears in the layer, however, should be faced in the opposite direction. Fig. 15 shows this in the 3–2 pack, and Fig. 16 in the 2–2 pack.

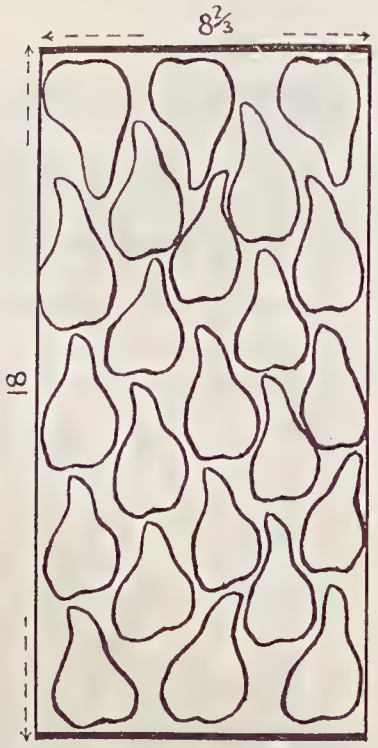


Fig. 15

Pears Packed on the 3–2 System.

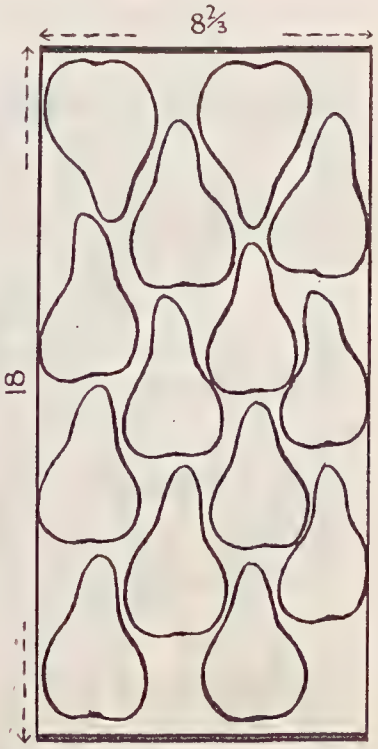


Fig 16

Pears Packed on 2–2 System.

As with apples, a layer of wood wool or corrugated cardboard is placed in the bottom of the case before packing, and again on the top layer before nailing on the lid. Each pear is wrapped in tissue paper, the end of the paper being drawn down round the stalk and folded neatly beneath the pear to serve as a pad or cushion for the other fruit.

It is very necessary to pack pears tightly, as the slightest rubbing or shaking of these fruits will be fatal.

READY RECKONER FOR PEARS.

STANDARDIZED PEAR PACKING FOR EXPORT—DIAGONAL SYSTEM—HALF BUSHEL DUMP CASE.

Inside case measurement, 18 x $8\frac{2}{3}$ x $7\frac{1}{8}$ = $1{,}111\frac{1}{2}$ cub. inches.

Pears must fit firmly with no two fruits resting directly on top of each other.

The number shown for each case is approximate; therefore, allow for very long or very short-shaped pears.

All 3–2 packs contain 4 layers.
„ 2–2 „ „ 3 „

Style of Pack.	Description of Layer.	Number of Layers in Case.	Number of Pears in Case.	
3–2	7 x 7	4	140	
3–2	7 x 6	4	130	←2-inch Medium shape
3–2	6 x 6	4	120	
3–2	6 x 5	4	110	
3–2	5 x 5	4	100	←$2\frac{1}{4}$-inch Medium shape
3–2	5 x 4	4	90	
2–2	7 x 7	3	84	
2–2	7 x 6	3	78	
2–2	6 x 6	3	72	←$2\frac{1}{2}$-inch Medium shape
2–2	6 x 5	3	66	
2–2	5 x 5	3	60	
2–2	5 x 4	3	54	←$2\frac{3}{4}$-inch Medium shape
2–2	4 x 4	3	48	
2–2	4 x 3	3	42	←3-inch Medium shape

READY RECKONER FOR PACKING PEACHES IN HALF-BUSHEL DUMP.

STANDARDIZED PEACH PACKING—DIAGONAL SYSTEM.

Inside case measurement, 18 x $8\frac{2}{3}$ x $7\frac{1}{8}$ = $1{,}111\frac{1}{2}$ cub. inches.

Peaches must be packed firmly but in no way overpressed.

All 3–2 packs contain 4 layers.
„ 2–2 „ „ 3 „

Style of Pack.	Description of Layer.	Number of Layers.	Total Peaches in Case.	Size of Peach.
3–2	6 x 5	4	110	$2\frac{1}{4}$ inch diameter
3–2	5 x 5	4	100	$2\frac{3}{8}$ „ „
2–2	6 x 6	3	72	$2\frac{1}{2}$ „ „
2–2	6 x 5	3	66	$2\frac{5}{8}$ „ „
2–2	5 x 5	3	60	$2\frac{3}{4}$ „ „
2–2	5 x 4	3	54	$2\frac{7}{8}$ „ „
2–2	4 x 4	3	48	3 „ „
2–2	4 x 3	3	42	$3\frac{1}{8}$ „ „

As all varieties of peaches are an average shape, arrows, to indicate which pack, are not needed. The same size in any variety will pack according to the table. Particularly in peach packing must the numbers in the layers be adhered to, and there must be no loose fruit, otherwise it will come too high and be bruised. Fig. 17 shows a case of Shepparton peaches at the Government Cool Stores, and illustrates the methods of packing the different sizes.

Fig. 17.—Various Packs of Peaches.

Questions and Answers.

As the following questions have been asked many times at various lectures and packing demonstrations, they are repeated here, with the answers given:—

Question.—I find, when packing the 2½-in. grade, that the top layer nearly always comes too low, and, to get the fruit to right height, the apples in the top layer have to be placed on top of those beneath, which, of course, spoils the diagonal system. Can you suggest a remedy in order that all the fruit will be diagonally packed and yet come up to the top of the case?

Answer.—The cause of the 2½-in. grade coming too low in this instance is due to packing it on the 2–2 pack. Use the 3–2 packs, which will alter the size of the pockets or spaces. With the 6 x 5 layer (193 apples in the case for the smaller of the grade) and with the 5 x 5 layer (175 apples for the larger of the grade) the fruit will come nicely to the top.

Question.—Why does it matter if apples in some of the layers are resting on top of each other as long as the fruit comes to the correct height and the layers are packed diagonally?

Answer.—Although the fruit in the layers may be packed diagonally, if specimens are pressing directly on top of each other we call it a mixed or a stacked pack. The case does not hold so much fruit if packed in that way, and keen buyers, knowing this, will not pay as much as they will for the standard pack, which contains more fruit. Mixed packs spoil the standardization of packing fruit.

Question.—My 3-in. grade are always too high or too low. I pack them on the 2–1 system generally. Other sizes I can manage well.

Answer.—Change from the 2–1 to the 2–2 system, with the 5 x 4 layer (total, 108 apples), as this alters the size of the pockets or spaces, and is similar to some varieties with 2½-in. grade. If, of course, the fruit is only a fraction low, it would not be necessary to change from one pack to another, but, instead, the pockets could be made smaller by altering the number of apples in the layer by slightly turning the fruit and closing them up, to allow the layer to be, say, 5 x 5 instead of 5 x 4, if the 5 x 4 layer came too low, and so on with all sizes.

Question.—Extremely small sizes, below 2 inches, are difficult to get up on 3–2 pack.

Answer.—A packing table for such a size is not mentioned, as the size is not commercial. However, the 3–3 pack with eight layers (not mentioned in Ready Reckoner) will bring the fruit to the right height.

Practical demonstrations in fruit packing may be arranged for co-operative sheds or growers' associations by applying to Department of Agriculture, Melbourne.

STERILITY IN HYBRIDS.

Mules and jennets, being the result of a reversed cross between the horse and the ass, will not breed. Physiologists find it hard to explain the cause, yet the fact remains, in the words of the scientist, that "all true hybrid Equidæ have proved sterile." Some time since, the Zoological Society in London obtained a fine stallion wild ass from Somaliland, which is, it appears, the only country where the African ass still survives as a wild animal. This stallion ass was crossed with mare asses of other breeds, such as Spanish and Tibetan. As the result of one cross with the latter, a fine female ass of 12 hands in height was obtained. She showed little of the distinctive colour markings of the sire, but except for her large size and almost complete absence of the stripes on the shoulder and along the back, in other respects closely resembled a well-bred donkey of these islands. From her in turn a foal of quite a distinct species has been obtained by crossing her with a pony stallion. The foal is coloured brown like the sire, but in other respects it favours the dam. There is much expectancy whether this hybrid will prove sterile or not. If it should turn out capable of breeding, as its colouring and shape suggest may be the case, it will be an interesting exception to a peculiar natural law that hitherto has not been known to be broken.

—*Farmers' Union Advocate,* New Zealand.

REGISTRATION OF STALLIONS.

Second Annual Report under the Horse Breeding Act 1919.

W. A. N. Robertson, B.V.Sc., Chief Veterinary Inspector.

The second year of operations under the Horse Breeding Act has been brought to a close with no more serious complaint from those engaged in the industry than that delay occurs in notifying owners of the result of the examining officer's inspection. In such cases, however, the delay has in almost every case been due to omissions on the part of owners themselves.

The Act requires that the owner of a stallion shall, on or before the 1st of July each year, make application for registration, and the application must be accompanied by the statutory fee of 20s. If owners of stallions which were last year registered as five-year-olds or over make early application, they may have their horses registered for the ensuing year at any time from now onwards. When applying, they should forward the old registration certificate; failure to do this will lead to correspondence and consequent delay in issuing a new certificate. If, in cases of this sort, immediate application for re-registration were received, certificates would be promptly issued. Thus, in the rush of the season, more time could be given to those cases where examination is necessary.

Those owners who have stallions that will be five years old or under during the coming season should also make early application, so that suitable arrangements may be made for the examinations. If an application be completed, as required by the Act, the veterinary officer deputed to make the examination, knowing this, will, if the owner so desires, inform him orally of his decision, and thus he will not have to await official notice, which cannot be sent till at least a day or so after the receipt at the head office of the inspector's report. If, however, an application be not in order, the examiner, not having been instructed to examine the horse, will refuse to inform the owner of his decision.

It is by no means rare for an owner to present a stallion for examination at an advertised parade, notwithstanding that no notification whatever has been given to the authorities. Though the officer conducting the parade may refuse to inspect such a horse, and insist on the owner applying for a special examination, the cost of which he would have to bear, this course is not adopted. Instead, the horse is examined, and a report made to head-quarters. Owners who have followed the correct procedure are immediately notified from Head Office, but those who have failed in this respect are not informed of the result of examination until their applications are in order. This means delay, as such owners must be communicated with and notified of their failure.

The work of checking applications and examinations is one requiring some time, and the four or five veterinary officers who conduct the examinations each hold, on an average, two parades a day. In many instances four or five parades are visited by one officer. This means a degree of "rush work" for the recording staff. Yet in no case last season where an application was properly made did more than the statutory fourteen days elapse before any owner was officially informed

of the result of an examination. A little forethought on the part of owners is all that is required to avoid any cause for complaint.

It is highly satisfactory that no more serious complaint can be formulated, and it serves to show that breeders are alive to the importance of the Act, and recognise the benefits to be derived from the system of registration. The delay in bringing similar legislation into operation in adjoining States has, no doubt, also been a cause of satisfaction to some, as it has enabled owners of rejected stallions to dispose of their horses at a minimum loss, and large numbers have crossed the borders.

The effect of this will be to give Victoria a considerable lead in the establishment of sound lines of blood, and to create a demand for horses bred in the State. The outlook for the horse breeding industry is bright, for with the impetus of immigration and closer settlement, a large number of draught types will be required. Motor traction may adversely affect the breeding of lighter types, but it will be a long day before it can be brought to such a stage as to interfere with the use of the draught horse on closely settled areas.

Review of Last Season.

Application for registration was made for 1,719 stallions, an increase of 46 over the first year. Of this number, 960 were registered without examination, having been registered as five-year-olds the previous season. Of the balance, 149 were stallions which had previously been rejected in regard to which it was incumbent upon the owners to make the statutory application, though knowing that registration would be refused. This provision of the Act has been a cause of some dissatisfaction, but it is necessary to guard against unregistered stallions being used for stud purposes; as with the information of the whereabouts of such horses a check can be kept on their operations. The effect of this provision has been, as already stated, that a number of rejected horses have left the State, a number have been castrated, and there are a few cases in which owners have not made application for registration. These defaulters will shortly be dealt with through the Courts for a breach of the Act and regulations, and there is little doubt that their number will be a rapidly diminishing one.

The remainder of applications, which were for horses five years of age or under, were dealt with by examination by veterinary officers. Six hundred and ten stallions were so examined, and of this number 193, or 31.6 per cent., were rejected.

Analyses of Rejections.

Of the 193 stallions rejected, 105, or 17.2 per cent., were refused registration as being below a reasonable standard, and 88, or 14.43 per cent., as being unsound. In the previous year, 23 per cent. were rejected under the first heading, and 22 per cent. under the second. The reason for the high percentage on that occasion was dealt with in last report, and there is every reason to believe that it will be non-recurring, and that the number of rejections will steadily decrease.

As in the previous year, draught horses show the greatest number of rejections, the total being unsound 61, or 19.6 per cent., and below standard 36, or 11.58. This closely approximates the rejections made during the last year of examination under departmental regulations in force before the present Act was introduced.

Further analyses shows that, as in previous years, sidebone was the most common of the hereditary unsoundnesses, 16.7 per cent. being found so affected, whilst 4, or 1.29 per cent., were affected with ringbone.

In light horses, bone spavin was the principal unsoundness detected, 12, or 6.19 per cent., being rejected under this head, whilst ponies, as in previous years, were found relatively free from unsoundness, only 6, or 5 per cent., being rejected.

Appeals.

Of the total number of stallions rejected—193—the owners of eleven were dissatisfied with the opinion of the veterinary officers, and lodged appeals. Eight were refused registration on the ground that they were not of a reasonable standard, one because of unsoundness, while two were rejected under both heads. The Boards appointed for the purpose duly considered the appeals, and were unable to support the owner's contention in any case, the whole number being dismissed, and the opinion of the veterinary officer upheld.

Parades for Coming Season.

The time-table of parades for the coming season, which appears herewith, has been drawn up so as to avoid as far as possible the necessity for any stallion having to be brought more than approximately 10 miles. If owners will carefully study the time-table, and select the most convenient centre, and give due notice of their intention to present their stallions, the whole of the examinations will be conducted prior to the opening of the breeding season. Additional parades cannot be arranged for until the present time-table is completed. This will mean that they cannot be held till very late in the season, and, further, will involve owners in additional expenditure, as they will have to meet the expense of such special parades. It should also be noted that while centres have been allotted as shown, a veterinary officer will not attend unless applications indicate that a horse or horses will be present at such centre.

Emphasis must be laid on the following points:

1. The owner of every stallion must apply for registration prior to 1st July.

2. All registrations made during the past season automatically expire on 30th June.

3. With the application for registration a fee of 20s. must be forwarded, and the expired certificate returned.

4. The centre most convenient for examination must be stated on the application.

5. *A veterinary officer will not attend any centre unless notice is given that a stallion will be presented for examination.*

6. If a stallion is sold, the certificate of registration must be officially transferred, otherwise the registration lapses.

7. In order to avoid delay and misunderstanding, early application for registration should be lodged.

I desire to again record my appreciation of the assistance rendered by police officers and secretaries of agricultural societies in the conduct

of inspection parades, without which the work of the examining officers would have been greatly increased.

TABLE SHOWING DETAILS OF EXAMINATIONS.

	Draught.		Light.		Pony.		Total.	
——	Examined. 311	Certificated. 214	Examined. 194	Certificated. 125	Examined. 105	Certificated. 78	Examined. 610	Certificated. 417
	Rejected.	Per cent. Rejected.	Rejected.	Per cent. Rejected.	Rejected.	Per cent. Rejected.	Rejected.	Per cent. Rejected.
Bog Spavin ..	2	·64	2	1·04	..	..	4	·66
Bone Spavin ..	..	..	12	6·19	3	2·86	15	2·46
Curb	1	·32	1	·52	2	1·90	4	·66
Ringbone ..	4	1·29	6	3·10	1	·95	11	1·80
Sidebone ..	52	16·72	..	..	..	..	52	8·52
Roaring ..	2	·64	..	..	..	..	2	·33
Through unsoundness ..	61	19·61	21	10·85	6	5·71	88	14·43
Through disapproval ..	36	11·58	48	24·74	21	20	105	17·21
Total ..	97	31·19	69	35·59	27	25·71	193	31·64

STALLION PARADES.

TIME TABLE, 1922-23.

Provided that the applications for registration received indicate that a horse will be in attendance there for examination, a parade will be held at each of the following places :—

Date.	Parade.	Time.	Officer Arrives.	Officer Departs.
Tuesday, June 27 ..	Mildura ..	2 p.m. ..	8.40 a.m. ..	7.30 a.m. (28th)
Wednesday, June 28..	Ouyen ..	10 a.m. ..	10 a.m. ..	Driving
Wednesday, June 28..	Walpeup ..	12 noon ..	Driving ..	Driving
Wednesday, June 28..	Underbool ..	2 p.m. ..	Driving ..	Driving
Wednesday, June 28..	Tutye ..	3.30 p.m...	Driving ..	Driving
Wednesday, June 28..	Murrayville..	4.30 p.m.	Driving ..	Driving
Thursday, June 29 ..	Dunolly ..	12 noon ..	9.7 a.m. ..	4.31 p.m.
Thursday, June 29 ..	Maryborough	5 p.m. ..	5 p.m. ..	5.20 a.m. (30th)
Tuesday, June 27 ..	Speed ..	10 a.m. ..	5.1 a.m. ..	10.54 a.m.
Tuesday, June 27 ..	Curyo ..	2 p.m. ..	12.24 p.m. ..	8.45 p.m.
Wednesday, June 28..	Woomelang	11 a.m ..	9.45 p.m. (27th)	11.55 a.m.
Wednesday, June 28..	Watchem ..	3 p.m. ..	1.23 p.m. ..	6.52 p.m.
Thursday, June 29 ..	Birchip ..	11 a.m. ..	7.40 p.m. (28th)	12.57 p.m.
Thursday, June 29 ..	Donald ..	2.30 p.m...	2 p.m. ..	5.50 a.m. (30th)
Friday, June 30 ..	St. Arnaud	10 a.m. ..	7.11 a.m. ..	3.7 p.m.

STALLION PARADES, TIME TABLE—*continued.*

Date.	Parade.	Time.	Officer Arrives.	Officer Departs.
Tuesday, June 27 ..	Sea Lake ..	10 a.m. ..	9.10 p.m. (26th)	Driving
Tuesday, June 27 ..	Nandaly ..	12 noon ..	Driving ..	Driving
Tuesday, June 27 ..	Kulwin ..	3 p.m. ..	Driving ..	Driving
Wednesday, June 28..	Culgoa ..	11 a.m. ..	9.54 a.m. ..	9.54 a.m. (29th)
Thursday, June 29 ..	Wycheproof	11.40 a.m.	11.40 a.m. ..	12.25 p.m.
Thursday, June 29 ..	Charlton ..	3 p.m. ..	1.5 p.m. ..	1.22 p.m. (30th)
Tuesday, July 4 ..	Rainbow ..	2 p.m. ..	9.55 p.m. (3rd)	3.10 p.m.
Tuesday, July 4 ..	Yaapeet ..	4.5 p.m. ..	4.5 p.m. ..	5.30 p.m.
Wednesday, July 5 ..	Jeparit ..	11 a.m. ..	8.10 p.m. (4th)..	Driving
Thursday, July 6 ..	Lorquon ..	11 a.m. ..	Driving ..	12 noon
Thursday, July 6 ..	Yanac ..	1.10 p.m...	1.10 p.m. ..	1.40 p.m.
Friday, July 7 ..	Ballan ..	10.5 a.m...	10.5 a.m. ..	12.7 p.m.
Tuesday, July 4 ..	Goroke ..	3 p.m. ..	1.15 p.m. ..	6 p.m.
Wednesday, July 5 ..	Horsham ..	9 a.m. ..	9.20 p.m. (5th)..	4.58 p.m.
Thursday, July 6 ..	Natimuk ..	10 a.m. ..	Driving ..	Driving
Thursday, July 6 ..	Toolondo ..	12 noon ..	Driving ..	Driving
Tuesday, July 4 ..	Hopetoun ..	11 a.m. ..	9.40 p.m. (3rd)..	7.20 a.m. (5th)
Wednesday, July 5 ..	Warracknabeal	2 p.m. ..	10 a.m. ..	7.30 p.m.
Thursday, July 6 ..	Beulah ..	11 a.m. ..	8.55 p.m. (5th)..	11.45 a.m.
Thursday, July 6 ..	Minyip ..	3.30 p.m...	3 p.m. ..	11.50 a.m. (7th)
Friday, July 7 ..	Murtoa ..	12.30 p.m.	12.30 p.m. ..	1.19 p.m.
Monday, July 10 ..	Pyramid ..	2.30 p.m...	2.13 p.m. ..	3.19 p.m.
Monday, July 10 ..	Mitiamo ..	1.30 p.m.	1.29 p.m. ..	1.46 p.m.
Tuesday, July 11 ..	Raywood ..	11 a.m. ..	9.18 a.m. ..	12.42 p.m.
Tuesday, July 11 ..	Tandarra ..	1 p.m. ..	12.56 p.m. ..	4.44 p.m.
Wednesday, July 12..	Bendigo ..	11 a.m. ..	6.10 p.m. (11th)	12.15 p.m.
Wednesday, July 12..	Marong ..	1 p.m. ..	12.44 p.m. ..	5.13 p.m.
Thursday, July 13 ..	Maldon ..	11.30 a.m.	11.30 a.m. ..	Driving
Thursday, July 13 ..	Shelbourne ..	1.30 p.m...	Driving ..	Driving
Thursday, July 13 ..	Castlemaine	3.35 p.m...	3.35 p.m. ..	8.12 p.m.
Friday, July 14 ..	Newstead ..	10.30 a.m.	8.16 p.m. (13th)	11.31 a.m.
Monday, July 10 ..	Ararat ..	3 p.m. ..	1.27 p.m. ..	4.35 p.m.
Tuesday, July 11 ..	Rupanyup ..	4.40 p.m...	4.40 p.m. ..	5 p.m.
Wednesday, July 12..	Marnoo ..	7 a.m. ..	6.5 p.m. (11th)..	8.20 a.m.
Wednesday, July 12..	Lubeck ..	1 p.m. ..	1 p.m. ..	1.43 p.m.
Wednesday, July 12..	Stawell ..	2.45 p.m...	2.41 p.m. ..	9.8 p.m.
Thursday, July 13 ..	Avoca ..	11 a.m. ..	8.20 a.m. ..	1.40 p.m.
Thursday, July 13 ..	Ben Nevis ..	3.30 p.m.	3.26 p.m. ..	Driving
Monday, July 10 ..	Macorna ..	3 p.m. ..	2.50 p.m. ..	9.17 p.m.
Tuesday, July 11 ..	Koondrook..	9.30 a.m...	9.30 a.m. ..	10.30 a.m.
Tuesday, July 11 ..	Kerang ..	2 p.m. ..	11.30 a.m. ..	3.55 p.m.
Wednesday, July 12	Swan Hill ..	10 a.m. ..	5.20 p.m. ..	Driving
Wednesday, July 12 ..	Ultima ..	1 p.m. ..	Driving ..	Driving
Wednesday, July 12 ..	Lalbert ..	3 p.m. ..	Driving ..	Driving
Thursday, July 13 ..	Piangil ..	10 a.m. ..	8.50 p.m. (12th)	Driving
Thursday, July 13 ..	Manangatang	1 p.m. ..	Driving ..	Driving
Thursday, July 13 ..	Chillingollah	3 p.m. ..	Driving ..	Driving
Monday, July 17 ..	Royal Show Grounds	10 a.m. ..		

STALLION PARADES, TIME TABLE—*continued.*

Date.	Parade.	Time.	Officer Arrives.	Officer Departs.
Monday, July 24 ..	Tungamah ..	1.30 p.m...	1.21 p.m. ..	3.26 p.m.
Monday, July 24 ..	Devenish ..	4.20 p.m...	4.14 p.m. ..	8.46 p.m.
Tuesday, July 25 ..	Yarrawonga	3.5 p.m. ..	2.5 p.m. ..	7.20 a.m. (26th)
Wednesday, July 26..	Benalla ..	10 a.m. ..	10 a.m. ..	11.25 a.m.
Wednesday, July 26	Rutherglen	2 p.m. ..	1.53 p.m. ..	7.50 a.m. (27th)
Thursday, July 27 ..	Chiltern ..	1.13 p.m...	1.13 p.m. ..	3.45 p.m.
Monday, July 24 ..	Tallangatta..	4 p.m. ..	3.53 p.m. ..	Driving (25th)
Tuesday, July 25	Corryong ..	12.30 p.m.	Driving ..	6 a.m. (26th)
Wednesday, July 26..	Wodonga ..	2 p.m. ..	12.45 p.m. ..	3.5 p.m.
Wednesday, July 26..	Inglewood ..	11 a.m. ..	9.45 a.m. ..	1.32 p.m.
Wednesday, July 26 ..	Boort ..	4.26 p.m...	4.26 p.m. ..	5 p.m.
Thursday, July 27 ..	Quambatook	10.30 a.m.	6.23 p.m. (26th)	11.22 a.m.
Thursday, July 27 ..	Korong Vale	2.32 p.m...	2.32 p.m. ..	3.25 p.m.
Thursday, July 27 ..	Wedderburn Junction	2.30 p.m...	2.30 p.m. ..	3.39 p.m.
Monday, July 31 ..	Kyabram	2 p.m. ..	12.40 p.m. ..	4.37 p.m.
Monday, July 31 ..	Tongala ..	3 p.m. ..	Driving ..	4.12 p.m.
Tuesday, August 1 ..	Tatura ..	10.30 a.m.	5.33 p.m. (31st)	11.42 a.m.
Tuesday, August 1 ..	Echuca ..	1.45 p.m...	1.45 p.m. ..	3.45 p.m.
Tuesday, August 1 ..	Rochester ..	4.30 p.m...	4.25 p.m. ..	9.3 a.m. (2nd)
Wednesday, August 2	Goornong ..	11 a.m. ..	10.8 a.m. ..	12.45 p.m.
Wednesday, August 2	Elmore ..	1.5 p.m. ..	1.11 p.m. ..	1.40 p.m.
Wednesday, August 2	Bamawm ..	3 p.m. ..	Driving ..	Driving
Thursday, August 3..	Gunbower ..	4.1 p.m. ..	4.1 p.m. ..	Driving
Friday, August 4 ..	Cohuna ..	11 a.m. ..	Driving ..	12.30 p.m.
Monday, July 31 ..	Moyhu ..	2 p.m. ..	Driving ..	Driving
Monday, July 31 ..	Whitfield ..	4 p.m. ..	Driving ..	Driving
Tuesday, August 1 ..	Wangaratta	11 a.m. ..	Driving ..	12.39 p.m.
Tuesday, August 1 ..	Bright ..	4.7 p.m. ..	4.7 p.m. ..	6.4 a.m. (2nd)
Wednesday, August 2	Myrtleford ..	2 p.m. ..	7.12 a.m. ..	7.12 a.m. (3rd)
Thursday, August 3..	Beechworth	11 a.m. ..	9.50 a.m. ..	12.51 p.m.
Thursday, August 3 ..	Everton ..	2 p.m. ..	1.11 p.m. ..	3.30 p.m.
Friday, August 4 ..	Euroa ..	10 a.m. ..	6.33 p.m. (3rd)..	11.12 a.m.
Friday, August 4 ..	Seymour ..	1 p.m. ..	12.11 p.m. ..	8.15 p.m.
Monday, July 31 ..	Dookie ..	12.43 p.m.	12.43 p.m. ..	1.3 p.m.
Monday, July 31 ..	Katamatite	2.8 p.m. ..	2.8 p.m. ..	2.55 p.m.
Tuesday, August 1 ..	Nagambie (Railway Station)	9 a.m. ..	7.34 p.m. (31st)	9.57 a.m.
Tuesday, August 1 ..	Shepparton..	2 p.m. ..	11.18 a.m. ..	8.26 p.m.
Wednesday, August 2	Numurkah ..	11 a.m. ..	9.23 p.m. (1st)..	12.38 p.m.
Wednesday, August 2	Strathmerton	1.10 p.m...	1.10 p.m. ..	1.20 p.m.
Wednesday, August 2	Cobram ..	2 p.m. ..	1.57 p.m. ..	3.10 p.m.
Thursday, August 3..	Nathalia ..	2 p.m. ..	1.37 p.m. ..	3.26 p.m.
Friday, August 4 ..	Murchison ..	10 a.m. ..	7.3 p.m. (3rd) ..	10.45 a.m.
Friday, August 4 ..	Rushworth..	11.48 a.m.	11.48 a.m. ..	12.25 p.m.
Friday, August 4 ..	Colbinabbin	1.30 p.m...	1.20 p.m. ..	2.30 p.m.

STALLION PARADES, TIME TABLE—*continued.*

Date.	Parade.	Time.	Officer Arrives.	Officer Departs.
Monday, August 7 ..	Heathcote ..	2 p.m. ..	11.30 a.m. ..	6.23 p.m.
Tuesday, August 8 ..	Alexandra ..	2 p.m. ..	12.30 p.m. ..	4.15 p.m.
Wednesday, August 9	Yea ..	9.30 a.m...	6.33 p.m. (8th)..	10.38 a.m.
Wednesday, August 9	Mansfield ..	2 p.m. ..	1.55 p.m. ..	3.30 p.m.
Thursday, August 10	Kilmore ..	9 a.m. ..	8.30 a.m. (driving)	10 a.m.
Tuesday, August 8 ..	Casterton ..	11 a.m. ..	7.55 p.m. (7th)..	Driving
Tuesday, August 8 ..	Coleraine ..	3 p.m. ..	Driving	Driving
Wednesday, August 9	Edenhope ..	12 noon ..	Driving ..	Driving
Wednesday, August 9	Harrow ..	2 p.m. ..	Driving ..	Driving
Wednesday, August 9	Balmoral ..	3 p.m. ..	Driving ..	Driving
Tuesday, August 8 ..	Dartmoor ..	11 a.m. ..	9 p.m. (7th) ..	9.55 a.m. (9th)
Wednesday, August 9	Heywood ..	11.45 a.m.	11.45 a.m. ..	12.15 p.m.
Wednesday, August 9	Portland ..	1.30 p.m...	1.5 p.m. ..	2.55 p.m.
Thursday, August 10	Branxholme	10 a.m. ..	5.25 p.m. (9th)..	11.55 a.m.
Thursday, August 10	Dunkeld ..	1.30 p.m...	1.30 p.m. ..	3.53 p.m.
Thursday, August 10	Hamilton ..	4.33 p.m...	4.33 p.m. ..	Driving (11th)
Friday, August 11 ..	Cavendish ..	10 a.m. ..	Driving ..	Driving
Monday, August 14 ..	Dean's Marsh	11.35 a.m.	11.35 a.m. ..	2.40 p.m.
Monday, August 14 ..	Birregurra ..	3.5 p.m. ..	3.5 p.m. ..	7.56 p.m.
Tuesday, August 15 ..	Colac ..	10 a.m. ..	8.23 a.m. (14th)	11.15 a.m.
Tuesday, August 15 ..	Gellibrand (Railway Station)	12.54 p.m.	12.54 p.m. ..	Continues journey by same train
Tuesday, August 15 ..	Beech Forest	2.30 p.m...	2.30 p.m. ..	3.40 p.m.
Wednesday, August 16	Laver's Hill	10 a.m. ..	5.50 p.m. (15th)	12.40 p.m.
Thursday, August 17	Winchelsea..	10 a.m. ..	7.52 p,m, (16th)	11.10 a.m.
Monday. August 14..	Beaufort ..	2 p.m. ..	12.27 p.m. ..	6.47 p.m.
Tuesday, August 15..	Kaniva ..	11 a.m. ..	2.28 a.m. ..	12.42 a.m. (16th)
Wednesday, August 16	Nhill ..	3 p.m. ..	1.22 a.m. ..	1.32 a.m. (17th)
Thursday, August 17	Dimboola ..	2 p.m. ..	2.13 a.m. ..	2.45 p.m.
Friday, August 18 ..	Willaura ..	11 a.m. ..	8.12 a.m. ..	2.19 p.m.
Friday, August 18 ..	Maroona ..	2.45 p.m...	2.45 p.m. ..	3.15 p.m.
Monday, August 14 ..	Port Fairy ..	4 p.m. ..	3.45 p.m. ..	5.42 a.m. (15th)
Tuesday, August 15 ..	Koroit ..	11 a.m. ..	6.10 a.m. ..	Driving
Tuesday, August 15..	Hawkesdale	2 p.m. ..	Driving ..	3.29 p.m.
Tuesday, August 15 ..	Penshurst ..	4.13 p.m...	4.13 p.m. ..	7.31 a.m. (16th)
Wednesday, August 16	Warrnambool	10.15 a.m.	10.15 a.m. ..	10.55 a.m.
Wednesday, August 16	Terang ..	12.30 p.m.	12.5 p.m. ..	1.30 p.m.
Wednesday, August 16	Mortlake ..	2.5 p.m. ..	2.5 p.m. ..	Driving
Thursday, August 17	Camperdown	11 a.m. ..	5.13 p.m. (16th)	12.25 p.m.
Thursday, August 17	Timboon ..	2.5 p.m. ..	2.5 p.m. ..	2.45 p.m.
Thursday, August 17	Cobden ..	3.45 p.m...	3.45 p.m. ..	Driving
Friday, August 18 ..	Werribee ..	11.47 a.m.	11.47 a.m. ..	1.15 p.m.
Monday, August 21 ..	Drysdale ..	11 a.m. ..	9.41 a.m. ..	4.6 p.m.
Tuesday, August 22 ..	Meredith ..	10 a.m. ..	9.42 a.m. ..	11.13 a.m.
Tuesday, August 22 ..	Bannockburn	2 p.m. ..	11.38 a.m. ..	4.23 p.m.
Wednesday, August 23	Lismore ..	2 p.m. ..	11.55 a.m. ..	5.25 p.m.
Thursday, August 24	Cressy ..	10.30 a.m.	6.12 p.m. (23rd)	11.5 a.m.
Thursday, August 24	Westmere ..	2 p.m. ..	1.17 p.m. ..	4.7 p.m.
Friday, August 25 ..	Inverleigh ..	10 a.m. ..	7.29 p.m. (24th)	Driving
Friday, August 25 ..	Geelong ..	2 p.m. ..	12.10 p.m. ..	5.55 p.m.

STALLION PARADES, TIME TABLE—*continued.*

Date.	Parade.	Time.	Officer Arrives.	Officer Departs.
Monday, August 21 ..	Waubra ..	1 p.m. ..	Driving ..	Driving
Tuesday, August 22 ..	Skipton ..	11 a.m. ..	Driving ..	Driving
Tuesday, August 22 ..	Linton ..	1 p.m. ..	Driving ..	Driving
Tuesday, August 22 ..	Ballarat ..	4 p.m. ..	Driving ..	7.30 a.m. (23rd)
Wednesday, August 23	Clunes ..	11 a.m. ..	8.54 a.m. ..	1.43 p.m.
Wednesday, August 23	Creswick ..	2.30 p.m...	2.16 p.m. ..	Driving
Wednesday, August 23	Kingston ..	4 p.m. ..	Driving ..	6.13 p.m.
Thursday, August 24	Daylesford ..	2 p.m. ..	7.17 p.m. (23rd)	6.20 a.m. (25th)
Friday, August 25 ..	Kyneton ..	11 a.m. ..	9.19 a.m. ..	Driving
Friday, August 25 ..	Redesdale ..	3 p.m. ..	Driving ..	Driving
Monday, August 21 ..	North Mirboo	2 p.m. ..	1.50 p.m. ..	4.15 p.m.
Tuesday, August 22..	Morwell ..	11 a.m. ..	5.55 p.m. (21st)	11.57 a.m.
Tuesday, August 22..	Traralgon ..	2 p.m. ..	12.10 p.m. ..	9.15 p.m.
Wednesday, August 23	Sale ..	11 a.m. ..	10.20 p.m. (22nd)	1.50 p.m.
Wednesday, August 23	Maffra ..	4.9 p.m. ..	4.9 p.m. ..	11.8 a.m. (24th)
Thursday, August 24	Cowwarr ..	2 p.m. ..	1.15 p.m. ..	5.1 p.m.
Friday, August 25 ..	Trafalgar ..	10.30 a.m.	6.51 p.m. (24th)	11.16 a.m.
Friday, August 25 ..	Moe ..	12 noon ..	11.31 a.m. ..	6.39 p.m.
Monday, August 28 ..	Warragul ..	10.15 a.m.	10.15 a.m. ..	11.5 a.m.
Monday, August 28 ..	Neerim South	3 p.m. ..	12.20 p.m. ..	5.35 p.m.
Tuesday, August 29 ..	Bunyip ..	10 a.m. ..	6.59 a.m. ..	11.25 a.m.
Tuesday, August 29 ..	Pakenham ..	12 noon ..	11.54 a.m. ..	Driving
Tuesday, August 29 ..	Berwick ..	3 p.m. ..	Driving ..	9.19 p.m.
Wednesday, August 30	Cranbourne..	11 a.m. ..	8.2 a.m. ..	6.20 p.m.
Thursday, August 31	Woolamai ..	9.30 a.m...	8.35 p.m. (30th)	10.8 a.m.
Thursday, August 31	Dalyston ..	2 p.m. ..	10.39 a.m. ..	4.12 p.m.
Friday, September 1..	Lang Lang ..	9.15 a.m...	6.16 p.m. (31st)	9.55 a.m.
Friday, September 1..	Dandenong..	11.30 a.m.	11.20 a.m. ..	12.39 p.m.
Monday, August 28 ..	Korumburra	10.30 a.m.	10.27 a.m. ..	Driving
Monday, August 28 ..	Leongatha ..	2.30 p.m...	Driving ..	11.4 a.m. (29th)
Tuesday, August 29 ..	Yarram ..	3.30 p.m...	3.22 p.m. ..	11.25 a.m. (30th)
Wednesday, August 30	Welshpool ..	2 p.m. ..	12.50 p.m. ..	12.50 p.m. (31st)
Thursday, August 31	Foster ..	2.1 p.m. ..	2.1 p.m. ..	2.21 p.m.
Friday, September 1..	Stony Creek	11 a.m. ..	3.19 p.m. (31st)	3.19 p.m.
Monday, August 28 ..	Bacchus Marsh	11 a.m. ..	9.22 a.m. ..	12.59 p.m.
Monday, August 28 ..	Melton ..	2 p.m. ..	1.21 p.m. ..	8.34 p.m.
Tuesday, August 29 ..	Mernda ..	11 a.m. ..	9.40 a.m. ..	1.59 p.m.
Tuesday, August 29 ..	Whittlesea ..	3 p.m. ..	2.25 p.m. ..	8 p.m.
Wednesday, August 30	Lilydale ..	2 p.m. ..	1.53 p.m. ..	5.20 p.m.
Thursday, August 31..	Riddell ..	2 p.m. ..	1.55 p.m. ..	2.51 p.m.
Friday, September 1..	Romsey ..	11 a.m. ..	10.41 a.m. ..	5.20 p.m.
Monday, September 4	Dromana ..	1.30 p.m...	1 p.m. ..	2.20 p.m.
Tuesday, September 5	Cowes ..	1 p.m.		
Wednesday, Sept. 6 ..	Hastings ..	10 a.m. ..	7.12 a.m. ..	11.47 a.m.
Wednesday, Sept. 6 ..	Frankston ..	2 p.m. ..	12.26 p.m. ..	5.36 p.m.
Tuesday, September 5	Orbost ..	2 p.m. ..	8.35 p.m. (4th)..	8.50 a.m. (6th)
Wednesday, Sept. 6 ..	Nowa Nowa	10.30 a.m.	10.14 a.m. ..	Driving
Wednesday, Sept. 6 ..	Buchan ..	3 p.m. ..	Driving ..	Driving
Thursday, September 7	Barinsdale ..	1 p.m. ..	11.20 a.m. ..	2.25 p.m.
Thursday, September 7	Lindenow ..	3 p.m. ..	2.59 p.m. ..	3.1 p.m. (8th)

STALLION PARADES, TIME TABLE—*continued.*

Date.	Parade.	Time.	Officer Arrives.	Officer Departs.
Tuesday, September 5	Omeo ..	3 p.m. ..	3 p.m. ..	6.30 a.m. (6th)
Wednesday, September 6	Bruthen ..	3 p.m. ..	1.30 p.m. ..	9.45 a.m. (7th)
Wednesday, September 20	Sunbury ..	11 a.m. ..	7.44 a.m. ..	1.23 p.m.
	French Island			
Saturday, September 23	Royal Show	1.30 p.m.		
Monday, September 25	Royal Show	9 a.m.		

GRADING OF DAIRY PRODUCE IN CANADA.

The importance of grading dairy produce for sale has for some time been clearly realized in Canada, where a system of grading has been carried out under both Federal and Provincial authorities, as well as by other bodies, both official and unofficial. The object of this grading has in some cases been mainly educational, while in others the aim has been purely commercial, but the system hitherto has been conducted on a voluntary basis and has had no legislative authority behind it.

During the 1920 session of the Canadian Parliament, a resolution calling upon the Government to establish a grading system was introduced into their House of Commons. The unanimous support of the members was accorded, and the Minister of Agriculture, in accepting the principle of the resolution, said that he would be prepared to carry out a scheme of grading for dairy produce as soon as the producers were ready for the introduction of such a system.

It would appear that the dairy producers must have afforded speedy evidence of their desire for Government action in this matter, for an Act, "to regulate the grading of dairy produce," cited as the Dairy Produce Act, was passed by the Canadian Legislature on 4th June, 1921. The Act empowers the Governor in Council to make regulations for the grading of dairy produce intended for export, the articles enumerated being "butter, cheese, and other food products manufactured from milk." It also provides for the appointment of official graders, and for the establishment of standards, definitions, grades and grading stores for dairy produce and the imposition of fees for the grading. The graders are to be empowered to issue certificates as to the quality and proper classification of any dairy produce which they have examined for the purpose. Fines of from 50 to 200 dollars, or imprisonment for a term not exceeding three months, may be imposed for contraventions of the regulations issued under the Act.—*Journal of the Ministry of Agriculture,* England.

WEEDS AND THEIR ERADICATION.

By H. W. Davey, F.E.S., Orchard Supervision Branch, Department of Agriculture.

(Continued from page 231.)

Perennial Californian Thistle, *Carduus arvenis,* Robs Compositæ.

This most troublesome pest occurs both on arable and grass lands, and unfortunately appears to be becoming more widely spread every year. It is known under several names, of which probably the most common are Creeping Thistle, Canadian Thistle, and Californian Thistle.

It is proclaimed a noxious weed under the Victorian Thistle Act for the whole of Victoria, under the name of *Carduus arvensis,* but the following are synonyms, viz., *Cirsium arvense, Serratula arvensis,* and *Cnicus arvensis.*

This perennial thistle is usually rather a low-growing plant compared with most thistles. Its flower-stems spring from creeping, underground root-stocks or rhizomes of a whitish colour, which spread themselves through the soil in all directions, often to a considerable depth, and if a plant be very carefully dug out of the ground, it will be seen that several apparently individual plants are connected with each other by one running root-stock (Fig. 36). This peculiarity and the great vitality of the root-stocks make it a most difficult weed to eradicate.

The leaves are from 2 to 6 inches long, usually green on both sides. They are narrower than those of most thistles, and are furnished with many hard, sharp-pointed spines.

It is remarkable for being what is known as Diœcious, that is bearing staminate or male flowers on one plant, and pistillate or female flowers on another plant; it is the latter which produce fertile seeds.

The blooms are of a purple colour, each about half-an-inch in diameter (Fig. 37).

This thistle is irregular in its fruiting, some years it will seed freely, but in others hardly at all. This may be largely due to weather conditions, that either assist or retard the pollen grains from the polliniferous anthers reaching the stigmas of the female flowers.

The seed of the Californian Thistle is furnished with a fringe of plumous bristles or awns, called a pappus, which enables the seed to be carried along by the wind.

Apart from the wind, its spread is probably largely due to impure seed, which is such a fertile medium for the dispersal of so many troublesome weeds. Farm produce, threshing machines, and farm implements are other factors in its spread.

Although this thistle will grow in most soils, it revels in those of a rich moist nature. When it is growing amongst crops, care should be taken to prevent its blooming, by cutting or hoeing it out as soon as the flower stems have made their appearance.

Although cultivation is the best method of suppressing Californian Thistle on large areas, the work must be carefully carried out, otherwise more harm than good will be done.

In the first place deep ploughing encourages the roots to penetrate the soil to greater depths. This can be noticed by comparing the

shallow-rooting system of the plant on grass lands with those growing on well-worked arable lands.

Further, the fleshy root-stocks are broken up and distributed by the plough away from the original patch, and under favorable, moist soil conditions most of these small pieces of root are capable of founding a new colony of thistles.

Fig. 36.—Two Distinct Plants of Californian Thistle growing from the same root-stock.

Therefore the eradication of this thistle by cultivation should only be attempted in summer, when the ground is in a very dry condition, so that the small pieces of root-stock will dry out on exposure, instead of developing into fresh plants. Disturbing the soil while it is at all moist will only tend to further spread the trouble.

Fig. 37.—Flowering Stem of Californian Thistle.

The frequent cutting of the Californian Thistle below the surface of the ground weakens, and will ultimately starve the root-stocks; but this work to be effective must be both persistent and thorough.

Summer fallowing is probably the best of all methods to adopt for freeing land of this thistle. Success will largely depend on weather conditions, as rain, in addition to delaying the work, would greatly benefit the thistles. If bare fallows were not desirable owing to the

Fig. 38.—Plant of Wild Radish.

loss of use of land for the time being, a cultivated crop, such as potatoes, could be grown. Special attention, however, would have to be paid to the potato rows, otherwise the thistles would spring up, and unless these were destroyed at once, it would become difficult later on to do this work without causing injury to the potato plants.

It is not advisable in the case of small colonies of thistles to destroy them by ploughing, owing to the liability of further spreading the pest. If the patch is a small one, a load of stable manure dumped on

it will smother the plants. Even if not put on thickly enough to prevent the thistles growing through it, the manure would cause the roots to starve to death, providing it were turned over every time the thistle shoots made their appearance, which operation would break the weak tender growths off. Small patches can, of course, be dug out, but the

Fig. 39.—Wild Radish showing seed pods and young plants.

necessity for care, if the work is to be effective, cannot be too strongly emphasized.

If arsenical preparations are used, they should be applied when the thistles are about half grown, and again when the new growths are about 5 inches high. This treatment will, in all probability, have to be repeated from three to five times before all the root-stocks are starved.

With large infestations the land should be ploughed three or four times at varying depths during the summer months for the purpose of bringing the roots to the surface and exposing them to the sun. In the intervals between the ploughing, the cultivator should be kept going, so that the formation of leaf-growth by this plant will be made impossible.

One fact that must not be lost sight of is that Californian Thistle is capable of spreading itself even if it is not allowed to produce seed. Indeed, the seed appears to be short-lived in the soil, only lasting for a year or two.

Wild Radish or Jointed Charlock, *Raphanus Raphanistrum*, L. Cruciferæ.

Among the cruciferæ plants, of which the Wild Radish is one, are some valuable food plants, the most familiar ones being the various kinds of Cabbage, Radish, and Turnips.

The Wild Radish (Fig. 38) is a common pest on cultivated land, and, if allowed to run to seed, rapidly fouls the ground. It is an annual or biennial, having almost glabrous leaves, the lower or basal ones being lyrate, that is pinnatifid, with the terminal lobe much larger than the other segments, the latter decreasing in size towards the petiole. The flowers are either straw-coloured or white, veined with purple, but it is the distinctive form of its fruit pods that makes this plant so easy of recognition. These pods when ripe are much constricted between the seeds, the latter being without partitions, and this gives them a knotted or bead-like appearance. In Fig. 39 these constrictions in the pods are not well shown; this is owing to the fact that the seed vessels were immature when the plant was photographed.

The old saying "One year's seeding makes seven years' weeding" applies with great force to the Wild Radish. If previous cultivations on land infested by radish have buried its seeds, seedlings will continue to make their appearance for a long time afterwards, whenever the soil is again broken up by cultivation.

For this reason, on land that has been fouled with Wild Radish, the buried seeds should be brought to the surface by frequent stirrings, so that by the influence of air, light, and moisture, they may be encouraged to germinate. Bare fallows, with frequent harrowings, would then destroy the seedlings. The depth of cultivation should be varied, in order that seeds buried at different depths may be brought to the surface for germination, until all the seed in the soil becomes exhausted.

Cereal crops should not be grown on badly infested land, as a crop of this description would allow the radish to mature its seeds before the cereal crop was harvested.

Crops requiring cultivation during their growing period would greatly assist in the freeing of land from this pest.

On land where the great mistake has been made of having ploughed in matured plants of radish carrying ripe seed, it will probably take a few years to free the ground. Even on land where cleaning crops are grown, such as potatoes, it will be necessary to exercise constant vigilance to see that no radish plants escape the cultural operations and mature their seeds.

Wild Radish is proclaimed a noxious weed for the State of Victoria under the Thistle Act.

(To be continued.)

GOROKE CROP AND FALLOW COMPETITIONS, 1921.

Report of the Judge, I. M. Tulloh, Field Officer, Department of Agriculture.

Situated on the fringe of the Wimmera, and separated from the fertile plains by several strips of desert country, the Goroke and Minimay districts form the western outposts of the Wimmera wheat belt.

The country is undulating, and in many cases still heavily timbered, and there is probably no other district in Victoria where such a variety of soils is met with. The rising ground is invariably light, and may be either loose sand or the light red soil which forms the bulk of the cultivated land of the district. The flats contain heavy black soil, and many now under cultivation compare favorably with the heavy soil of the "Plains."

Mr. J. E. Molloy's Crop of Federation.

Along low-lying parts run a chain of swamps, which are linked up by water-courses during the winter months. In many cases the water spreads over large areas of flat country, and for this reason, a considerable portion of this heavy land is not available for cultivation. A comprehensive drainage system, though a costly undertaking, would prove of immense benefit to many district wheat-growers.

It must be admitted that wheat-growing here has not yet been brought to the high standard of the "Plains," due mainly to local difficulties which have been discussed in previous reports.

It is generally recognised, however, that the methods are rapidly improving, and for this much credit is deservedly given to the local crop and fallow competitors, of which the one now under notice is the fifth.

A spirit of friendly rivalry has sprung up among competitors, and so long as this continues, the competitions will play a big part in still further advancing the wheat-growing industry in the district; an extra

working of the fallow, an increase in seed and manure, the use of selected seed, &c., applied with the object of doing better than the next man, must show this effect in a higher average yield per acre.

The number of entries this year (28) shows a substantial increase, and is ten more than last season.

The competition is divided into two sections for *each* heavy and light soils, *i.e.*, Fallow, 1920; Crop, 1921; Best Crop, 1921.

SECTION I.—HEAVY SOIL.

Aggregate of points for fallow, 1920, and crop, 1921.

——	Fallow 1920.	Crop 1921.					Crop Total.	Total.
		Yield.	Purity.	Freedom from Disease.	Freedom from Weeds.	Evenness.		
Maximum Points	**100**	**40**	**20**	**15**	**15**	**10**	**100**	**200**
H. C. Block (*a*)	100	32	19	13	11	8	**83**	**183**
T. M. Molloy	93	32	17	12	14	9	**84**	**177**
J. E. Molloy	90	30	20	13	13	9	**85**	**175**
C. B. Block	92	35	17	9	11	8	**80**	**172**
H. C. Block (*b*)	91	27	19	12	10	6	**74**	**165**
W. H. Stehn	84	34	17	11	11	7	**80**	**164**
F. Hinch	74	34	17	14	13	8	**86**	**160**
F. O. Robertson	75	31	19	14	13	7	**84**	**159**
P. Molloy	85	26	19	13	10	5	**73**	**158**
Caldow Bros.	74	29	17	15	13	7	**81**	**155**
Delaney Bros.	71	28	17	13	11	6	**75**	**146**

It will be seen that the winner, Mr. H. C. Block, owes his success to his splendid fallow, which was awarded 100 points last year. The crop, also, was a well-grown one, but rather thin, and would have benefited by a heavier application of both seed and manure. The variety was Federation, and was very free from foreign varieties. It contained a fair sprinkling of weeds, mainly wild oats.

The land had been ploughed in July, spring-toothed at the end of August, and lightly disced late in October. It was spring-toothed before drilling, when 57 lbs. of seed and 80 lbs. of superphosphate were sown per acre at the latter end of June, after which it was harrowed.

Mr. T. M. Molloy's crop was grown on the crown of a rise, where the soil was much lighter than that of the winner. It was red soil, but more friable and fertile than the ordinary light soil of the district. This crop was very even, dense, and well-headed. There was a moderate number of foreign varieties present. The land was ploughed during July and August, scarified early in October, and harrowed three weeks later. It was scarified in front of the drill, and harrowed immediately after sowing. Seventy-five lbs. of seed and 112 lbs. of manure were sown per acre.

Mr. J. E. Molloy's crop received similar treatment. It was grown on the lower edges of a slope, and included a portion of heavy soil, on which the crop was exceptionally dense. The average yield, however, was reduced by the lighter crop on the remainder, which had been thinned somewhat by the soakage from the slopes. This crop had been

sown with very pure seed, and was practically free from foreign varieties.

Mr. C. D. Block had a very fine crop. Unfortunately, it had been sown with unpickled seed, and was infected with "ball smut." It was put in with the stump-jump cultivator and drill during the last week of June, sowing 70 lbs. of seed and 112 lbs. of manure per acre, and was harrowed immediately after. This crop received the highest number of points for yield.

SECTION II.—BEST CROP OF 50 ACRES ON "HEAVY SOILS."

	Yield.	Purity.	Freedom from Disease.	Freedom from Weeds.	Evenness.	Total.
Maximum Points	**40**	**20**	**15**	**15**	**10**	**100**
F. Hinch	34	17	14	13	8	**86**
J. E. Molloy	30	20	13	13	9	**85**
F. O. Robertson	31	19	14	13	7	**84**
H. C. Block	32	19	13	11	8	**83**
W. H. Stehn	34	17	11	11	7	**80**

All the crops in this section appear in Section I.

The winning crop, that of Mr. F. Hinch, promised to yield well. It was grown on new ground, which was exceedingly crabholey, and ploughed up in a very rough state. Though the rainfall during the winter months was well up to the average, the fine spells between the wet periods prevented the lodging of water, so that the depressions, as well as the banks, were well covered with a thick and heavy crop. A drain made through this paddock also assisted largely in carrying off surplus water during the winter. Fallowing had been done during July, August, and September. This work was delayed owing to water lying in the crabholes. It was spring-toothed early in October. Levelling had been commenced in spring (using a "smoodger)", but owing to pressure of other work only a small area was worked. The land was spring-toothed before drilling, which was commenced during the last week in May, and completed early in June. Seventy-five lbs. of seed and 90 lbs. of manure were sown per acre. Having been sown early, the crop (Federation) was tall, and showed a tendency to lodge in heavy patches. There was a sprinkling of foreign varieties present, but, except for occasional plants of "spear" thistle, it contained comparatively few weeds.

The crop of Mr. J. E. Molloy, which has been discussed in Section I., must be considered as probably the most creditable one in this section. It has been mentioned that it was grown on much lighter ground than those of the other competitors, yet it has been placed only one point behind the winning crop. Mr. Molloy attributes the success of this crop to the thorough scarifying given before sowing, and to the liberal application of seed and manure.

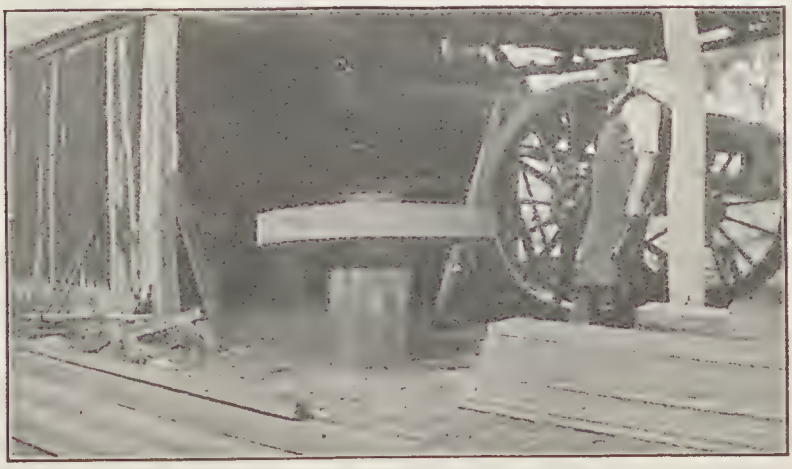
Mr. Robertson's crop received similar treatment to Mr. Hinch's, which it adjoined. It consisted of Federation and Minister. The Federation was a strongly-grown crop, but was inclined to be patchy. The

Minister was a thick crop, but had gone down badly. It should yield well, provided that it can be all gathered at harvest time.

Section III.—Light Soils.

Aggregate of points for fallow, 1920, crop, 1921.

—	Fallow 1920.	Crop 1921.					Crop Total.	Total.
		Yield.	Purity.	Freedom from Disease.	Freedom from Weeds.	Evenness.		
Maximum Points	**100**	**40**	**20**	**15**	**15**	**10**	**100**	**200**
Caldow Bros.	87	29	17	14	13	8	**81**	**168**
T. Delaney	87	28	17	13	13	8	**79**	**166**
G. McPhee	90	30	14	10	13	9	**76**	**166**
E. Cross	87	21	19	15	14	9	**78**	**165**
H. C. Block (*a*)	91	19	19	13	13	6	**70**	**161**
F. Edwards	95	16	16	14	11	6	**63**	**158**
H. C. Block (*b*)	95	9	18	14	12	4	**57**	**152**



Mr. C. D. Block building a Table-top Waggon at his Farm.

Messrs. Caldow Brothers' crop was of Penny and College Purple Straw; the Penny appeared to be much the heavier crop. This had been grown on new ground, and had been well seeded and heavily manured—60 lbs. of seed and 112 lbs. of manure per acre. The crop was tall and dense for this class of soil, and was fairly free from strangers. The land was ploughed in July, scarified in October, and again after heavy rain at the end of December. It was spring-toothed in front of the drill, and was sown during the latter end of April.

Mr. T. Delaney's crop was also a very fine one. It was dense and well grown, fairly free from strangers, and contained few weeds. The land was fallowed during June and July, and was spring-toothed in

September, and the crop put in with the combined drill early in May. Seventy lbs. of seed and 112 lbs. of manure were sown per acre. A part of the fallow which had not been cultivated in spring appeared to carry a considerably lighter crop than the remainder.

Mr. G. McPhee's crop was a heavy one, and was awarded the highest points for yield in this section. It was growing in a loamy bank on the edge of a swamp. It had been well put in. A portion of the land on which cape weed had sprouted was skim-ploughed early in April. It was all cultivated at the end of that month, and again in front of the drill a fortnight later. Fifty lbs. of seed and 70 lbs. of manure were sown per acre. The crop, however, was marred to a considerable extent by the presence of foreign varieties and barley plants, and it was also infected with "ball smut."

Mr. E. Cross had a very attractive crop, which was grown on very light soil. It was a light crop, but scored well in points under the various headings.

Mr. H. C. Block's two crops, and that of Mr. Edwards, suffered from water-logging, and were very much thinned out.

SECTION IV.—BEST CROP OF 50 ACRES ON LIGHT SOIL.

—	Yield.	Purity.	Freedom from Disease.	Freedom from Weeds.	Evenness.	Total.
Maximum Points	**40**	**20**	**15**	**15**	**10**	**100**
A. Richards	28	20	13	13	8	**82**
Caldow Bros.	29	17	14	13	8	**81**
C. D. Block	26	18	14	14	8	**80**
H. C. Block	19	19	13	13	6	**70**

Mr. Richards' winning crop of Federation was sown from seed obtained from Longerenong College, part last year, and part the year before. It was true to type, and contained no foreign varieties. The ground was ploughed in August; it was harrowed in October, and disced at the end of March. The crop was put in early in May, with the spring-tooth working in front of the drill, and was harrowed immediately after. Seventy-five lbs. of seed and one bag of superphosphate were sown per acre. Though grown on buckshot country, this crop was very dense, and well-headed. The average yield, however, was reduced owing to one paddock having a number of lighter patches, where water had lain during the winter.

Mr. Richards considers that the heavy seeding and the very liberal manuring stood to his crop, and he intends applying similar quantities when sowing next year.

Mr. C. D. Block's crop was grown on light buckshot country also. The land had been cropped in 1920, but owing to the heavy rains that year it had been badly water-logged, and a very poor crop resulted,

although it had been sown twice—40 lbs of seed and 112 lbs. of manure per acre being used on each occasion. The land was ploughed up again at the end of April, drilled immediately, and then harrowed. Seventy lbs. of seed and 112 lbs. of manure were sown per acre. As the crop the previous year had been ruined through water-logging, it can be reasonably assumed that the heavy rains last winter had also affected the crop to a considerable extent. The good seeding (70 lbs. per acre) and the heavy manuring, however, stood well to the crop, and it had developed nicely. It was not as dense as that of either Mr. Richards or Messrs. Caldow Brothers, but was even, and comparatively free from weeds. Had this crop been given better drainage, it would have grown more strongly, and been much denser.

The crops of Messrs. Caldow Brothers and H. C. Block have been discussed in Section I.

Heavy Soils.

The exceptionally favorable season resulted in all the crops being of a fairly high standard. The quality of the heavy land in the district is equal to much of that on which fifteen-bag crops were grown on the "Plains" this year.

In making a comparison, however, between the crops exhibited in this competition and those inspected on heavy soils in other competitions throughout the Wimmera, it must be admitted that there is a distinct difference in favour of the latter, and there must be a definite reason for it.

Summer fallowing has become a routine practice on the plains. During the last two seasons, I have not seen any crop grown in this district on summer fallow. It is noticed that frequently the fallowing is not finished till the end of August, or even late in September. Ploughing so late in the season must result in large losses of moisture through evaporation, while it gives little opportunity for the germination and destruction of weeds during spring; it prevents good consolidation below, and the forming of an effective mellow mulch.

On the "Plains," summer fallowing has come to stay. The benefits from the practice have been amply illustrated by the winning crops in the various Wimmera competitions in recent years.

Apart from the actual gain to the crop itself, it means a better distribution of the work, and any land not turned over before seeding can easily be dealt with before the end of the winter. To get the best results from the fallow, it is necessary that it should be worked deeply and thoroughly, in early spring, so that weeds will be effectively dealt with; the scarifier is the most suitable implement for this purpose; the combined drill or spring-tooth can be used for lighter workings later in the season. These later workings should be given before weeds get too strong a hold, so that deep working at this time of the year will not be necessary. Harrowing immediately after summer rains conserves additional moisture, and brings the fallow into nice mellow condition.

It is noticed that the later sowing on the heavy soils, with heavier applications of seed and manure, is being adopted. This is a practice

that has been definitely proved successful, and over a number of years has increased the average yield up to 4 bushels per acre. Although the winning crop, that of Mr. Hinch, was sown early, it must be remembered that this was on new ground; it had been liberally seeded and manured, and the season was one of those which occasionally occur, when the difference between yields from early and late sowing is not great.

Thorough preparation of the seed bed is necessary. The best results are gained when two germinations of weeds are destroyed after the autumn rains. These usually occur during the latter end of May. A scarifying is given a fortnight or so later; then, towards the end of June, sowing is commenced, scarifying again in front of the drill, or sowing with the combined drill. A harrowing a day or two afterwards prevents any weeds from taking root in the moist soil.

Light Soils.

In the past, it was considered that light seeding and manuring was necessary for the light country. The crops were invariably light. Recent experiments have determined that this class of soil can be heavily manured with advantage, and that it pays to put in a liberal quantity of seed. By this means, the crops, though not as heavy as those on black soils, have been greatly increased in density.

A notable feature of the crops this season was the failure of those grown in fallows, which were awarded the highest points. This was due to one cause—"water-logging." It has been generally recognised that crops on light soils are favoured by a moderate or even light rainfall. The crops of Messrs. Caldow Brothers and Mr. H. D. Walker last year, and of Messrs. McPhee, Richards, Delaney, and Caldow Brothers this year, show that equally good, if not better, crops can be grown during a wet season. All of these crops were grown on sloping land, which was afforded fair natural drainage.

The clay sub-soil, which is found from 3 inches to 9 inches below the surface, holds the water in a wet season, and unless this is drained off, the whole of the surface soil becomes water-logged, with fatal results to the crop. This can be greatly overcome by ploughing in lands not more than a chain in width, and even less where practicable. Care should be taken that the furrows are not filled in during future workings. Mr. Walker's paddock was treated in this manner last year, with very beneficial results.

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In conclusion, I desire to thank the officers of the Society, the Secretary (Mr. D. Vorwerg), and the competitors for the thoughtful arrangements made in connexion with the judging.

CROP AND FALLOW COMPETITION, DONALD, 1921.

Report and Awards of the Judge, H. A. Mullett, B.Ag.Sc., Chief Field Officer.

Herewith I am forwarding you my report and awards as judge of the Crop and Fallow Competition recently conducted by your society.

The interest taken in the competition in this the initial year should prove distinctly encouraging to the Donald Agricultural Society, whose object is to improve the local methods of crop production and to stimulate greater interest in farming generally.

In all twenty-four entries were inspected. They were distributed throughout the rich wheat-growing districts of Donald, Laen, Cope Cope, and Swanwater West.

The District.

Donald is interesting in that it stands practically at the head of a vast belt of red loam, which stretches east towards Charlton and Boort, and includes the Goulburn Valley. The black clay loams of the Wimmera, which trend in a general easterly direction from Rupanyup, Murtoa, Horsham, and Dimboola, definitely cease at Laen and Rich Avon to the west of Donald. The soil transition is accompanied by a characteristic increase in the proportion of buloke timber present. At Donald box timber occurs mainly on a few low-lying flats, where the soil is still black. Near Donald, too, one meets the first of those sandy rises clothed with Murray pine, which are a characteristic feature of the red loams and the Goulburn Valley.

Naturally the soil change has led to some differentiation in farming methods from those of the Wimmera. The land is more frequently spelled in grass than that further west, and as a rule lighter sowings of wheat and manure are given. Another feature is that many farmers still perform the major portion of the cultivation of the fallows with the skim plough, though the scarifier has a vogue on any black land. In a number of instances the wheat is sown with the "box plough," an implement consisting of a patent seed drill attached to a skim plough. Federation wheat is the main variety grown, but Penny is also popular.

On the whole the crops appeared to be somewhat lighter than those in the Wimmera country to the west. For the present it is difficult to say whether the difference is due to season, soil, or to method. But if the competitions are continued for a few years, it ought to be possible to speak with definiteness. For the present it must be accepted that a crop produced in the Laen district by the use of approved Wimmera methods was the most successful this year. Whether those methods will give the same results in the future remains to be seen. In view of the soil differences that exist, it might be advisable for competition purposes in the future to separate the red land from the black.

The scale of points adopted in judging was that now standardized throughout the Wimmera. The marks are allotted so as to place a premium on good farming. In the crop section 35 per cent. of the award goes for yield, 20 per cent. for trueness of the wheat to its type, and 15 per cent. each for such important desiderata as absence of

Residence of Mr. C. Harcoam, Donald.

A Comfortable Farm Home (Mr. H. S. Pope's, Donald).

weeds, absence of disease, and the general regular character of the crop. Of course, it may happen occasionally that the heaviest crop is not placed first, because of some disability on the score of disease, &c., but it is evident that the winning crop is always one produced by good farming methods.

Results.—Section 1.

FOR BEST GROWING WHEAT CROP, NOT LESS THAN 50 ACRES.

The winner of this section proved to be Mr. R. A. Adams, of Laen. The crop—Federation—was grown on a fine black flat, which had been well worked and liberally manured. In this crop the heads were densely packed. It was level and free from undergrowth or wild oats. The yield should have been heavy. Points were deducted because of the presence of a few foreign heads. The crop was surprisingly regular throughout.

The land was skim-ploughed in July, 1920, in the spring (September); it was scarified and harrowed, and then re-scarified in October. After harvest it was harrowed in March, scarified in April and again in June. Sowing then took place, the seed being applied at the rate

Portion of Winning Crop—Mr. R. A. Adams'.

of 66 lbs. per acre, with 112 lbs. of superphosphate. A light harrowing was given after the drill. Important considerations in raising prolific crops on land of this class are thorough cultivation to shallow depth, suppression of the weeds, late seeding, and the use of from 65 to 75 lbs. of seed with about 1 cwt. of superphosphate.

The entry awarded second place is that of Mr. John T. Dickerson. Fifty acres of Federation were shown. The bulk of the paddock was black soil, but there were red patches. This crop showed some unevenness, but scored well because it was practically pure and there were no weeds and little disease. Some of the other crops, however, were heavier.

The fallow on which this crop was grown was prepared as follows:—In March it was thoroughly fallowed with the skim plough. In July a further skim ploughing was given. Subsequently sheep were given access to the paddock. The scarifier and harrows were used in the spring and in the autumn. Towards the end of May the land was re-scarified and sown at the beginning of June with seed at the rate of 60 lbs. per acre, and with 90 lbs. of superphosphate.

Mr. A. Black showed an exceptionally heavy crop of Federation, which scored well in all respects except under the heading of freedom from disease. The crop was situated on rising ground of a rich loamy character. The land was summer-fallowed with a skim plough in March. In July and August it was also skim-ploughed and again in September. The fallow was then left until March, when it was harrowed after rain. The seed was sown without further cultivation with a "box" plough at the end of May and the beginning of June. Eighty pounds of seed and 80 lbs. of superphosphate were used. It will be noted that most of the cultivation was done with the skim plough.

The remaining crops were on the whole lighter in yield than the three mentioned above. In some cases they lost points because of numerous foreign heads present, and in others because of smutted heads, or again "take-all."

Heavy Crop of Penny Wheat (Mr. G. Coates', Donald).

Details.—Section I.—Best Growing Wheat Crop, not less than 50 Acres.

Name.	Yield.	Trueness to Type.	Absence of Disease.	Absence of Weeds.	Evenness.	Total.
Maximum points	**35**	**20**	**15**	**15**	**15**	**100**
R. A. Adams	35	15	15	15	15	95
J. T. Dickerson	30	18	13	15	13	89
A. Black	33	17	8	14	15	87
H. S. Pope	30	16	11	14	13	84
Deane Wells	27	17	11	13	15	83
H. Hancock	31	16	8	13	15	83
J. Coates	26	17	13	12	13	81
G. A. Pope	27	14	13	14	13	81
C. Harcoam	31	14	9	11	14	79
Clifford Bros.	24	17	6	13	13	73
L. V. Dunn	25	16	10	11	11	73

Results.—Section 2.

FOR THE BEST FALLOWED LAND, NOT LESS THAN 50 ACRES.

In judging the fallow some difficulty was experienced in making fair comparisons between land of such varying classes as, say, red clays and friable black loams. In future it would facilitate the work if the black land were placed in a class by itself. The scale of points used for the fallows, like that of the crops, has been framed with the regard for encouraging best farming practice; 25 per cent. of the award is given for the character of the mulch, *i.e.*, the loose earth covering the fallow; 25 per cent. for the amount of moisture stored in the fallow, 25 per cent. for the absence of deleterious weeds, and the final 25 per cent. for cultivation.

The art of fallowing the friable Wimmera soils consists largely in conserving moisture from the preceding year for the current crop, as well as in the destruction of weeds and in the provision of cover for the seed. To conserve moisture effectively the surface must be kept in a loose condition to a depth of 2 or 3 inches. More than that,

Judging the Winning Fallow (Mr. R. A. Adams', Donald).

judgment and skill must be exercised in the use of the various cultivation implements. If the work is not done while the soil is in a moist condition, a mulch of unsatisfactory texture results, and if the depth of the implements is not carefully regulated the mulch may be too deep at one point and too shallow at another. The greatest care must be taken to use the lightest implement that will cope with the work. Heavy implements, especially in dry seasons, tend to stir the land too deeply, hence a firmly consolidated seed bed under the loose surface is difficult to maintain. By judicious sheeping and cultivation when the weeds are young, this may be avoided.

The ideal fallow on friable land in the Wimmera is one where the seed bed is firm and moist and level as a billiard table. It should be overlain with some 2 to 3 inches of loose mellow soil. This is the class of fallow, other things being equal, which has given the heaviest yields in the Wimmera during the past five or six years.

DETAILS.

Mr. R. A. Adams, who won the crop section, was also placed first with his fallow. The paddock shown consisted of 54 acres of fine black soil. The mulch was of mellow texture, though somewhat shallow. The maximum amount of moisture had been conserved, though, of course, recent rains had been responsible for some of it. There was a complete absence of weeds, and the cultivation had been effectively done. The seed bed was moist, firm, and level throughout the field. The following treatment was given:—The paddock was summer-fallowed early in April, 1921, with a skim plough. In July the paddock was scarified and then harrowed. These operations were repeated in September and again in October. Mr. Adams once depended entirely on the skim plough and harrows. Four years ago he adopted the scarifier and the methods its use permits. He estimates his yields to be considerably improved. He places them at from two to three bags to the acre better.

The fallow allotted second place was that of Mr. H. Hancock, also of Laen. The land was black loam. The moisture content was high, the mulch effective, though shallow, and in particular a well-consolidated level seed bed, showing skilful cultivation, was in evidence. This was winter fallow, ploughed with a set plough in July and then harrowed, and the harrowing was repeated in August. In September the scarifier was resorted to, and then the harrows. Finally, at the end of October the land was re-scarified and then harrowed.

The paddock of red loam submitted by Mr. G. Coates was almost equally good. Points were, however, lost on account of the slightly uneven character of the seed bed, due to the implements working at irregular depths. This paddock was thoroughly ploughed in March, 1921, to a depth of from 4 to 4½ inches. In June it was skim-ploughed, in mid-September spring-toothed, and then it was harrowed in October and again in November.

Excellent fallows were also submitted by Messrs. J. T. Dickerson, S. Coates, T. C. Leslie, and W. R. Pope. An interesting paddock was shown by Mr. E. Baddack. The soil was a deep sandy loam. The practice is to plough it very deeply, and then lightly skim plough when weeds appear. Good crops are grown.

DETAILS.—SECTION II.—FOR BEST FALLOWED LAND, NOT LESS THAN 50 ACRES.

Name.	Soil-Type.	Moisture.	Mulch.	Weeds.	Cultivation.	Total.
Maximum points		**25**	**25**	**25**	**27**	**100**
R. A. Adams	Black clay loam	25	24	25	25	99
H. Hancock	Black clay loam	25	24	24	25	98
G. Coates	Red loam	25	24	24	23	96
J. T. Dickerson	Black clay loam	25	25	22	24	96
S. Coates	Grey flat	25	24	25	21	95
T. C. Leslie	Black loam	25	20	25	25	95
W. R. Pope	Black flat	22	23	25	24	94
D. Wells	Black clay loam	24	23	20	25	92
E. Baddack	Deep sandy loam	24	21	22	25	92
A. Black	Reddish loam	25	23	21	22	91
H. Pope	Black loam, red patches	24	22	25	20	91
G. A. Pope	Red clay, black patches	23	21	22	22	88
C. Harcoam	Red clay	20	21	23	21	85

Manuring the Wheat Crop.

In recent years there has been a remarkable increase in the amount of superphosphate used per acre by Wimmera farmers. They find the heavier dressings pay. That experience is backed up by the results on the Government experimental plots. The nearest experimental plot to Donald is that at Warracknabeal on the Mallee fringe. The soil is a red sandy loam not unlike much of that at Donald. For a period of ten years these experiments have been in progress. The results show that with Federation wheat 1 cwt. of superphosphate produced about 2 bushels more wheat per acre than did ½ cwt. Valuing the wheat at 4s. a bushel and the manure at 6s. 6d. per cwt., the increased profit per acre after paying for the extra manure is 4s. 4d. In addition, when the heavy manured land is rested in grass, there is a decided improvement in the number of stock that can be carried.

Convenient Type of Stable—one of three built by Messrs. Pope Brothers.

(Plans and specifications of this building will be included in the next issue of this Journal.)

Wheat Diseases.

The crops at Donald this year were exceptionally free from take-all and black rust. Not so, however, ball smut, which was widespread. It should be remembered that ball smut takes a far greater toll of the crop than is apparent to the eye at harvest. Numbers of plants are killed earlier in the season, and others lose in vigour.

The presence of smutted heads in a crop is certain proof of faulty pickling. Since the smut fungus cannot live in soil, the only means by which the crop may be infected is by the use of infected seed. Pickling with a fungicide will kill the smut without materially affecting the wheat; but care must be taken to make the pickling solution up to the exact strength, otherwise either the smut will not be killed, or on the other hand, the grain may be unduly injured.

If formalin is used the correct strength is 1 lb. of formalin to 40 gallons of water, with immersion for three minutes; with bluestone the standard strength is 1½ lbs. to 10 gallons of water, with immersion for three minutes. Unless the wheat is tipped out of the butts into the pickle, and any smut present carefully skimmed off, there is always a chance of re-smutting the wheat, even though it has been well pickled. All bags should be pickled, and each lot of the pickle should be made up in the same way. Where these precautions are faithfully taken there will be no smut.

Seed Wheat.

Judging by the number of strengers seen in most of the crops at Donald, it is evident that some of the seed has been in the district for a considerable time. It pays to regularly obtain seed which has been subjected to improvement by selection. Compared with ordinary Federation, hand selected Federation at Longerenong College is much more prolific. A bag or two should be secured each year, and the farm wheat bred up from that.

. . . . . .

In conclusion, I beg to thank the secretary, Mr. J. B. Duncan, and the president, Mr. H. Pope, and other officers of the society for their help and consideration during the judging.

CAUSE OF SECOND GROWTH IN POTATOES

The effects of continued drought on potatoes are generally most evident in the maturing of the tubers; these remain small and ripen prematurely, those that attain an approximately normal size being apt to show uncommonly large formations of secondary tubers. The explanation of this latter phenomenon is that after prolonged foliage development, the underground eyes of the potato plant develop tubers which store the already manufactured starch. The drier the summer the more quickly the tuber ripens. The cells (except the youngest about the eyes) gradually lose the ability to increase in size to any extent. If now, after drought, rain falls, the young cells around the eye, with their still elastic walls, begin to grow, and a secondary tuber, superimposed on the primary one, results.—*Agricultural Gazette*, New South Wales.

WORLD'S POULTRY CONGRESS.

(Continued from page 244.)

A. V. D. Rintoul, N.D.D., Chief Poultry Expert.

The Relation of Carotinoid Pigments to Poultry.

Professor H. L. Kempster, of Missouri University, designated carotinoid pigments as belonging to two classes—*carotin*, which is the principal yellow pigment found in carrots, and *xanthophyll*, the principal yellow found in yellow maize.

A test was made on hens fed on the following rations: (*a*) rich in xanthophyll and low in carotin; (*b*) rich in carotin and low in xanthophyll; (*c*) low in both carotin and xanthophyll. The results showed no difference between (*b*) and (*c*), but the rich xanthophyll ration gave highly coloured yolks; the principal yellow pigment used by the fowl is therefore probably xanthophyll. Professor Kempster noted a more than casual relation between the simultaneous presence of carotinoids and fat soluble vitamine in butter fat and the leafy parts of green plants, and the absence of carotinoids and the fat soluble vitamine in lard. Yellow maize is richer in fat soluble vitamine than white maize.

These facts seem to indicate a relation between carotinoid pigments and vitamines, although carteinoid pigments are found in vegetable oils (cotton seed oil) with no vitamine presence. It has been generally noted that in hens which naturally carry yellow pigmentation, a positive correlation exists between pale shanks, ear lobes, beak, &c., and more or less heavy egg production. The theory advanced by Professor Kempster is that the fading of the yellow pigmentation as a result of fecundity is not due to the subtraction of pigmented fats from these parts, but that the normal appearance of xanthophyll in yellow fleshed breeds is the result of a natural excretion, and that fecundity merely deflects this path of excretion to the egg yolk, thereby removing the source of pigment to the visible parts of the fowl.

The result is that the pigment found in the skin at the outset of fecundity is gradually excreted towards the epidermis, where it either becomes oxidized (decclourized), or wears away as the result of structural changes in the epidermis.

Two full-grown white Leghorn cockerels, reared on a carotinoid free (colourless) ration showed complete absence of pigment in the skin. They were then fed a ration with a high proportion of yellow maize. In seventy-two hours yellow colour began to appear, and on the fifth day the shanks and beak showed yellow. The next day it was visible in ear lobes, eye ring, &c. Later, one of these birds was again fed on carotinoid free ration, and after ninety days the beak, ear lobes, comb, skin, &c., were entirely colourless. According to the hypothesis previously advanced, if fecundity deflects the path of the excretion of the xanthophyll from the skin to the ovaries, it is to be expected that no restoration can be effected as long as fecundity continues. In proof of this, hens which were laying, and had continuously been fed on a xanthophyll free ration were subsequently fed rations rich in xanthophyll. After thirty days' feeding of yellow maize in one case, and green stuff in another, the egg yolks were highly coloured. The conclusions drawn from experiments were:—

1. Xanthophyll is the only carotinoid pigment used by the fowl.

2. Carotinoid pigments have no important bearing on growth, fecundity, or reproduction.

3. The fading of yellow pigment is due to the fact that fecundity deflects the excretion to the egg yolk.

4. It is impossible to restore xanthophyll to the skin whilst fecundity lasts.

5. Fading of ear lobes, beak, &c., is an index of fecundity only, not of heavy egg laying.

6. The principal sources of xanthophyll are green feed and yellow corn.

The Irish Egg.

Its Collection, Marketing, and Transport.

Mr. P. J. O'Neill pointed out that Ireland, for her size and population, came first as regards export of eggs. Prior to the war, Ireland exported 8,000,000 long hundreds (ten dozen) eggs, Russia 6,000,000, and Denmark 4,000,000 to Great Britain. This is of interest because the population of Ireland is about equal to that of Australia.

In 1913, the year before the war, 40 per cent. of all eggs imported into Great Britain came from Ireland, which latter country, in 1918, exported over £18,000,000 of poultry eggs.

This remarkable success is largely due to the co-operative societies which collect eggs by motors, the organization of these societies being chiefly the work of the Irish Agricultural Organization Society. Eggs are all tested, and those of inferior quality, yet suitable for early consumption, are packed separately, and branded "ungraded."

The Department of Agriculture for Ireland graded the 2-oz. egg (15 lbs. per 120) as "selected," and eggs weighing 16 lbs. per 120 "extra selected," and there is also a third class "ungraded" for eggs of any size. The following descriptions are given:—

"New Laid," First Quality.—Yolk translucent or faintly visible; white translucent and firm; shell clear or faintly mottled; depth of air space rarely exceeding $\frac{1}{8}$ inch.

"Fresh Eggs," Second Quality.—Yolk more visible, yet keeping near the centre; white translucent and firm, but weaker than first quality; shell usually clear or faintly mottled, but may be distinctly mottled; air space usually $\frac{1}{8}$ to 3-16 inch in depth.

Third Quality.—Yolk clearly visible, swinging freely, but not anywhere in contact with the shell; white translucent, but weaker and more watery than second quality eggs; shell mottled, spots spreading and merging into one another; air space 3-16 to $\frac{3}{8}$ inch in depth. Eggs of this quality are suitable for cooking.

The highest price is obtained for brown-shelled eggs on the British market.

Egg Export of Denmark.

Fr. Möller detailed the Danish export of eggs, carried out by the Danish Farmers Co-operative Egg Export Association, which was founded in 1895, and now embraces about 540 affiliated local societies or circles, with a total membership of more than 50,000. Every egg is stamped with a rubber stamp which indicates the local society, and in addition the individual member, so that any egg can be traced from the breakfast table in England to the actual Danish poultry farm upon which it was laid.

Eggs are not sold by the score or the dozen, but by weight. The committee of the Central Society fixes the price every week, according to market quotations.

At the central packing stations the eggs are graded into the following sizes:—13, 14, 15, 16, 17, 18, and sometimes to 20 lbs. for 120 eggs (great hundred). The 15-lb. "pack" is the 2-oz. egg, so that the 20-lb. pack actually represents 32 ozs. to the dozen!

The eggs are sorted first on to wooden frames for size, and then tested, so that dirty, stale, or otherwise inferior eggs may be rejected. Clean rye straw is used at the top and bottom of each crate, with wood wool between each layer, the crates commonly containing twelve great hundreds. Any member who has delivered defective eggs is warned for the first offence, and then fined for subsequent offences.

Cellars are also used for pickling eggs, and these eggs are subsequently marketed, after being carefully tested as pickled eggs.

At the end of the year the net profit is distributed amongst the members in proportion to the value of eggs which each member has supplied. This system of co-operation assures that the maximum price will be received by the producer, as there are no middlemen's profits to be paid out of the money received from the English merchant who purchases the eggs.

Ordinance Relative to Sale of Eggs in Paris and the Seine District.

The sale of eggs is controlled by the Prefect of the Police, and all bad eggs have to be destroyed under the supervision of the sanitary veterinary inspector. Egg merchants who "candle" their eggs without the assistance of a testing inspector must advise the sanitary service of all eggs found spoilt. Where eggs can still be used, if there is no delay in immediate use, they may be utilized by dry biscuit makers. These eggs are sold as "waste" eggs. Biscuit manufacturers using these eggs must notify the Prefecture of Police, and their factories are under control of the sanitary veterinary inspector.

Preserved eggs must be sold as such, and dairy produce shops, groceries, biscuit manufactories, &c., where eggs are either sold or utilized for alimentary purposes, are subject to inspection. A special service is made available by the sanitary inspection branch, whose work consists of verifying the contents of parcels.

In limiting, if necessary, the waste, *i.e.*, the number of broken, spoilt, frozen, and small eggs.

In calculating the number of eggs that must be repaid to the buyer.

Where this service is made use of, the number of eggs missing or in excess is counted, and waste will give right to the following conditions:—

(*a*) Two-thirds of the number of broken eggs, except that any number over 3 per cent. of broken eggs shall be repaid in full.

(*b*) The total number of spoilt eggs.

(*c*) Two-thirds of the number of eggs called "small stains."

(*d*) Half the number of frozen eggs, or eggs kept in lime.

(*e*) One-third of the number of small eggs. Those are considered small which will pass through a ring of 35 millimetres diameter.

(To be continued.)

OUR BACKWARD COW.

By R. T. McKenzie, Senior Dairy Supervisor.

Lord Northcliffe, in a series of articles in *The Times* entitled "The Empty Continent," comments on the backwardness of the Australian cow compared with the Danish, which produces nearly twice as much under harsher natural conditions. Our average yield per cow is about 150 lbs. of butter fat, whilst in Denmark it is in normal years about 240 lbs.

In this country, with such congenial soil and climate, it is a great reproach to the enterprise and progress of the dairy industry that the productiveness of our average cow should be so low.

Recently several conferences of those engaged in the industry have been held to consider the economic situation caused by the rapidly falling price of butter fat.

One speaker declared that it cost 2s. per lb. to produce. Various suggestions were made to control prices by arbitrary methods, to turn milk into other goods such as dried milk, condensed milk, casein, and so on, where the fall in price was negligible compared with butter. No one suggested that by an intelligent campaign the capacity of the dairy herds could in a brief space of time be doubled, and thus lower by half the cost of producing a pound of butter fat. That this could be accomplished is beyond doubt, but there is no royal road. Before it can be attained the scrub bull has to disappear from the majority of dairy herds, and a great extension of herd testing must be made.

With the great fall in the price of butter the mongrel bull becomes a national calamity, and because only a few register records of individual cows the average dairy farmer keeps nearly twice as many cows as his output warrants. The old phrase, that the bull is half the herd, is true; in fact, this is an under-estimation of his value. The bull is the pivot upon which the future efficiency of the whole herd rests. Thus the first stage in the improvement of the dairy cow must begin with the bull. He may sire all the calves in the herd, if it is not a large one, exercising a potent influence on every calf for good or evil.

In America there is a nation-wide movement to wipe out the scrub bull by legislation on somewhat similar lines to our own stallion legislation. West Virginia has taken the lead with such success that the epitaph of the scrub bull has been written.

Nearer home, in South Australia, the authorities are considering proposals on the same lines. A proposal has been made in New Zealand that all dairy bulls be registered, and a tax put on the mongrel sire.

A dairyman cannot make his industry more interesting and profitable than by the grading up of his herd, and it can be done in a very short time by the use of a pure-bred sire whose ancestors have genuine pedigrees of performance, on selected cows. The Government standard-herd test shows that we have a great number of high-class dairy cattle amongst the pure breeds, and by the use of a sire from these proved yielders, the dairy capacity of the average cow could be doubled in a

few years. It is much easier to improve the milking qualities of a herd of cross-breds than of a pure-bred herd. The scrub bull does not possess the prepotency of the pure-bred. Briefly, he is deficient in that prepotency of blood that enables the pure-bred to impress upon his progeny the characteristic features of his breed to a greater or less extent, no matter what class of cow he may be mated with.

The present juncture would be an opportune time to start herd-testing societies. It is only by systematically weighing and testing the milk of each cow that the "robber" can be detected. There is no other way. It has been found by the experience of herd-testing societies in every country in which they have been established that about 30 per cent. of the cows tested are unprofitable. In other words, they do not pay for the time, care, and feed bestowed on them. No doubt when butter fat was worth 2s. 8d. per lb., almost any cow showed a profit above her keep, but with the decline of the price of butter fat to less than 1s. per lb. only the best will show a profit.

Milking qualities, as with other characteristics, are hereditary. Therefore, for breeding purposes, it is very necessary that the farmer should know the best milkers. It seems a great reflection on the intelligence of dairymen that not 1 per cent. of the cows in Victoria are tested. It is no wonder then, that, while other great dairying countries are yearly increasing their output per cow, through the agency of the cow-testing societies, we in Victoria are standing still, if we are not actually going backwards. If the present slump impresses on the dairy farmer the necessity of improving the quality of his herd by the use of a pure-bred sire and systematic culling of his cows, it may be a blessing in disguise.

PLANTING AND RECONSTITUTION OF VINEYARDS.

Conditions Governing the Distribution of Phylloxera-Resistant Vine Rootlings and Cuttings.

The conditions subject to which Victorian vine-growers may purchase phylloxera-resistant vine cuttings and rootlings (grafted and ungrafted) from the State Vine Nursery, at Wahgunyah, have been drawn up for the current year, and copies of same are available on application.

Beyond the necessary alterations of dates (substitution of 1922 for 1921, &c.) the conditions are practically the same as for last season. There is no alteration in price.

The time within which applications will be received remains as it was last year, as will be seen below. Applicants are required to finally decide, when filling in their application forms, as to their stock and scion requirements; no amendment can be permitted later.

It will suffice here to explain that resistant vines are supplied to intending planters in any of the following forms, and at the prices stated; packing extra in the case of consignments forwarded by rail:—

Resistant rootlings, grafted with scions previously supplied by applicants, at per 1,000, £12 (Deposit, 30s. per 1,000).
Resistant rootlings, ungrafted, at per 1,000, £3 (Deposit, 15s. per 1,000).
Resistant cuttings, at per 1,000, £1 10s.

Application Forms.

No application will be entertained unless made on the forms supplied for the purpose, which are obtainable from the Director, Department of Agriculture, Melbourne, or from the Manager, Viticultural Station, Rutherglen.

Separate forms are provided for (*a*) Grafted Rootlings (green form); (*b*) Ungrafted Rootlings and Cuttings (yellow form). Applications must be filled in on the proper forms, and accompanied by a deposit as specified above.

Each applicant for forms will be supplied with a copy of the detailed conditions governing the distribution of phylloxera-resistant vine rootlings (grafted and ungrafted) and cuttings.

Applicants are earnestly requested to thoroughly familiarize themselves with these. *They are warned that under no circumstances can any departure be permitted from the regulations governing the distribution as detailed therein, nor can any request for special consideration be entertained.*

Dates before which Applications must be made.

For Grafted Rootlings (1923 distribution, June to August inclusive), applications will be received until 30th June next. (For the 1922 distribution the time for receiving applications closed on 30th June, 1921, and present applicants cannot be supplied until 1923.)

For Ungrafted Rootlings, to be distributed from July to August, 1922, inclusive, applications will be received until 31st July, 1922.

For Cuttings (see conditions), applications will be received until 30th June, 1922.

Supplying Clean Districts.

The nurseries in which grafted rootlings are raised being situated in phylloxerated districts, *these cannot be supplied to growers in clean districts.* To do so would be manifestly unfair to owners of existing vineyards in such districts.

PIG-FEEDING EXPERIMENTS IN ENGLAND.

Experiments have been carried out recently at Reading University College Farm to determine the value of whey in feeding pigs, and it has been demonstrated that pigs fed on whey and whey constituents, and having access to grass, will thrive to a much greater degree than those kept under the usual sty conditions and fed on swill, &c., both

in regard to appearance and quality of their flesh. These experiments suggest that whey contains an insufficiency of fat-soluble vitamine A. to allow excess for storage in the fat, and that grass or green food makes up for the deficiency.

Results show that young pigs fed on grass and toppings for a period of 84 days increased on the average of 49 lbs. in live weight, whereas similar pigs fed with whey, grass and toppings for the same period made an average live weight increase of 72 lbs.

These experiments tend generally to substantiate what has for a long time past been the opinion of cheesemakers throughout the country—namely, that very considerable advantage can be gained by the feeding of whey to pigs.

Pigs and the Fat-Soluble Factor.—Another experiment at Reading University College Farm has recently been carried out with the object of ascertaining the influence of the fat-soluble factor on the growth of pigs. Four animals were employed, divided into two groups. Group 1 was placed on a diet containing the fat-soluble factor, and Group 2 was kept on a diet rigorously restricted in that factor. The test was carried out over a period of five months, and further experiments are in progress.

The results so far obtained are as follows:—

(1) No definite rickets were induced in sucking pigs fed from birth on a diet rigorously restricted in the fat-soluble factor.

(2) The addition of the fat-soluble factor in the form of cream, cod-liver oil and lucerne to a deficient diet stimulated growth in pigs declining in weight.

ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.L.S., Pomologist.

The Orchard.

CULTIVATION.

Cultivation work should be well on the way by this time. The ploughing should be advanced, so as to leave plenty of time for other orchard work. Autumn ploughing may be rough, but care should be taken to plough to the trees, so that a drainage furrow is left between the rows.

MANURING.

It is just possible, where heavy crops have been carried, that a top dressing of stable manure will be required to add humus to the soil. The fertility of the soil must be maintained; and, although stable and

chemical manures as a general rule are of undoubted value as tree stimulants, well-cultivated and thoroughly tilled land will always carry fair crops with far less manure. Further, if the orchard land is well drained, cultivated, and sub-soiled, any manures that are used will be far more beneficial to the trees. The more suitable the conditions that are given to the trees, the better they can appreciate and assimilate their food.

Perhaps the most useful and valuable of manures is stable manure. It is of great use, not only as a manure and as an introducer of necessary bacteria into the soil, but its value in adding humus to the soil is incalculable. Organic matter, such as stable manure, introduced into the soil quickly becomes humus; this greatly ameliorates and improves soil conditions. It is impossible to say what quantity of stable manure is necessary per acre; that can be determined only by circumstances. Orchards in different climates and varying soils will require differing quantities. A too liberal use of stable manure will be over-stimulating in most cases, and at all times an excess beyond what is necessary for present use will only be waste, as humus is readily lost from the soil, once it is in an available food form.

It has been pointed out in these notes previously that an improved physical condition is far more profitable to the fruit-grower than the continued use of manures. A tree will be far more productive if it is happy in its soil conditions; uncomfortable conditions will always result in unprosperous trees.

A dressing of lime, using about 4 or 5 cwt. per acre, is of great value in stiff or heavy orchard lands; and it may be given at this season. The lime, which must be fresh, should be distributed in small heaps between the trees, covered with a layer of soil, and allowed to remain for a few days before ploughing or harrowing in.

PESTS.

The advice given last month for spraying should be followed, particularly where any oil emulsions or washes are to be used.

Orchards will benefit if an attack is now made upon the Codlin moth. All hiding places, nooks, and crannies, where the larvæ have hidden, should be thoroughly searched and cleaned out. The orchardist has far more time now to do this work than he will have in the spring time.

GENERAL WORK.

Drainage systems should now be extended with as little loss of time as possible.

New planting areas should be prepared, and subsoiled or trenched wherever possible.

The Vegetable Garden.

Weeds must be kept down in the vegetable garden. Weeds are generally free growing at this season; their growth is very insidious, and they will crowd out the young seedlings or plants in a very quick time.

Hoeing and hand weeding must be resorted to, preferably hoeing. The frequent use of the hoe in winter time is of much benefit in the vegetable garden. A varied assortment of crops is now being produced; and if these can be kept growing much better crops will result. The soil quickly stagnates in the winter, and the only way to prevent this is to keep the surface stirred. Thus, a double service is performed with the aid of the hoe.

The application of lime is of great necessity at this season. In addition to amending unhealthy and unsuitable soil conditions, lime is particularly useful as an insecticide. It assists in destroying in immense numbers both eggs and insects that would breed and live in the ground ready to do damage to all classes of vegetable crops. Therefore, wherever possible, the soil should receive an application of lime. The garden should, as well, be manured with stable manure, but not for some weeks after the lime application.

Cabbage and cauliflower plants may be planted out; and seeds of parsnips, carrots, onions, peas, and broad beans may be sown.

The Flower Garden.

The whole flower section should now be thoroughly dug over. All beds should be cleaned up, top dressed with manure, and well dug. The light rubbish, such as foliage, twiggy growths, weeds, &c., may all be dug in, and they will thus form a useful addition to the soil. These should never be wasted. Only the coarser and stouter growths should be carted away for burning, and then the ashes may be used as manure. No part, whatever, of garden rubbish or litter need be wasted. In one form or another it should be replaced in the soil.

May is a good month for establishing new gardens, and for planting out. All deciduous plants and shrubs may now be planted. It is not necessary to dig a deep hole for planting. A hole in which the roots of the plant can be comfortably arranged, without crowding or cramping, will be quite sufficient for the purpose.

Continue to sow seeds of hardy annuals, including sweet peas, although the main crop of sweet peas should by this time be well above ground. Where there has been any overplanting, the young plants will readily stand transplanting, and this will greatly assist those that are to remain. Annuals should not be crowded in the beds. They require ample room for suitable development, and thus the seeds should be sown thinly or the plants set out a good distance from each other.

All herbaceous perennials that have finished blooming may now be cut down. Included amongst these are phlox, delphiniums, &c. If these are to remain in their present situation for another season it is always an advantage to raise them somewhat, by slightly lifting them with a fork, so that too much water will not settle around the crowns; they may also be mulched with stable manure, or the manure may be forked into the soil around the crowns.

REMINDERS FOR JUNE.

LIVE STOCK.

HORSES.—Those stabled and in regular work should be fed liberally. Those doing fast or heavy work should be clipped; if not wholly, then trace high. Those not rugged on coming into the stable at night should be wiped down and in half-an-hour's time rugged or covered with bags until the coat is dry. Old horses and weaned foals should be given crushed oats. Grass-fed working horses should be given hay or straw, if there is no old grass, to counteract the purging effects of the young growth. Old and badly-conditioned horses should be given some boiled barley. Paddocked horses should be looked at from time to time to ascertain if they are doing satisfactorily.

CATTLE.—Cows, if not housed, should be rugged. Rugs should be removed and aired in the daytime when the shade temperature reaches 60 degrees. Give a ration of hay or straw, whole or chaffed, to counteract the purging effects of young grass. Cows about to calve, if over fat, should be put into a paddock in which the feed is not too abundant. If in low condition feed well to tide them over the period and stimulate milk flow. It should be borne in mind that the cows most liable to milk fever are those that have been low in condition and are rapidly thriving. The treatment described in the *Year-Book of Agriculture*, 1905, should be almost invariably successful. It will generally be found most profitable to have cows calve in autumn. They will then pay well for feeding through th winter, and will flush again with the spring grass. Calves should be provided with warm dry shed. Cows and heifers for early autumn calving may be put to the bull. Observe strict cleanliness and regularity with regard to temperature and quantity of feed to avoid losses and sickness incidental to calf rearing.

PIGS.—Supply plenty of bedding in well ventilated sties. Sows in fine weather should be given grass or lucerne run. Bulletin on the Pig Industry is now available.

SHEEP.—Clear muck-balls from tails and legs of all sheep. Have the wool cleared from round udders and eyes of all young lambing ewes, and see them first thing every morning. Mark the ram lambs at earliest chance, providing they are strong and the season assured. Cut off ewes with oldest wether lambs to best pasture available.

Sheep with overgrown hoofs are unthrifty. Whenever noticed trim back into shape; they cut easily during winter. If left, are conducive to lameness, and even foot rot. In the case of common foot rot, or scald, the feet can be placed in a thick paste made of lime and hot water. Obstinate cases of long standing may need more drastic remedies, and persistent attention. In all cases pare away all loose portions, and leave the diseased parts clearly exposed.

Foxes are more ravenous during winter months. Sparrows, starlings, and parrots are good bait. Poisoning lambs already killed usually accounts for scavenger foxes only.

Every fox is not a lamb killer. Remove all lambs for two or three nights if at all possible, and birds then will rarely fail to entice Reynard the second or third night.

Powdered strychnine, just sufficient to cover nicely a threepenny-piece, is the usual dose. On the more valuable lambs fix a light tin collar, cut from 2 inches wide at the top of the neck to 3 inches wide below, fastened underneath in one place only, near the breast, with fine wire, and lying open towards the throat, allowing the lamb to both suck and feed. It should be cut as large as possible, yet not large enough to permit of its falling off over the lamb's head. This makes a guard that rarely fails to prevent a fox getting to the main blood vein. Remove the guards when the lambs are about eight weeks old.

POULTRY.—Supplies of shell grit and charcoal should always be available. Sow a mixture of English grass and clover; this not only removes taint in soil but provides excellent green fodder for stock. Where possible, lucerne and silver beet should now be sown for summer feed; liver (cooked) and maize aids to egg production during cold weather. Morning mash should be mixed with liver soup given to the birds warm in a crumbly condition. All yards should be drained to ensure comfort for the birds.

CULTIVATION.

FARM.—Plough potato land. Land to be sown later on with potatoes, mangolds, maize, and millet should be manured and well worked. Sow malting barley and sow cereals. Lift and store mangolds, turnips, &c. Clean out drains and water furrows. Clean up and stack manure in heaps protected from the weather.

ORCHARD.—Finish ploughing; plant young trees; spray with red oil or petroleum for scales, mites, aphis, &c.; carry out drainage system; clean out drains; commence pruning.

VEGETABLE GARDEN.—Prepare beds for crops; cultivate deeply; practise rotation in planting out; renovate asparagus beds; plant out all seedlings; sow radish, peas, broad beans, leeks, spinach, lettuce, carrot, &c.; plant rhubarb.

FLOWER GARDEN.—Continue digging and manuring; dig all weeds and leafy growths; plant out shrubs, roses, &c.; plant rose cuttings; prune deciduous trees and shrubs; sow sweet peas and plant out seedlings.

VINEYARD.—Thoroughly prepare for plantation, land already subsoiled for the purpose. Remember that the freer it is kept from weeds from this forward, the less trouble will there be from cut-worms next spring. Applications for grafted resistant rootlings and cuttings must be made before the end of the month—see current issue. Pruning and ploughing should be actively proceeded with. In northern districts plough to a depth of seven or eight inches. Manures should be applied as early as possible.

Cellar.—Rack all wines which have not been previously dealt with. Fortify sweet wines to full strength.

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An extremely valuable perennial grass for swamps, morasses, lagoons, billabongs, and wet and flooded country. It grows luxuriantly to a height of 6 or 7 feet with a branched flower stalk 12 inches long. The root formation comprises a rhizome (a long underground creeping root), from which deep masses of rootlets grow downwards, and from which a wealth of stems and leaves grow upwards. Like most grasses with strong creeping roots, it is easily propagated by planting out, and this is effected very simply by throwing the roots on land that is constantly under water, or, at least, wet all the year round. While it thrives in shallow water, it grows in water of considerable depth. For swamps which hold water all the year round it would be difficult to find a more suitable grass, for the amount of fodder it produces annually is extraordinary. Poa Aquatica should be given a trial by those having continuously wet lands, for it rapidly replaces useless rushes and sedges of all kinds. It is its rhizome habit that enables it to destroy the strongest rushes or sedges.

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Kikuyu does not seed, and must be propagated from roots. Plant roots in rows 2 feet apart; 12 to 15 inches between plants.

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DEPARTMENT OF AGRICULTURE, VICTORIA

Red Poll Dairy Herd

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BULL CALVES are sold for delivery at a month old at prices based approximately on the actual milk and butter fat record of the dam at the rate of 1s. per lb. of butter ***fat*** yielded.

(For Record of Yields of dams see Red Poll Herd Book.)

The Bulls in Use include—

LONGFORD MAJOR (Imported)

Dam's Record 14713 lbs. milk ... 6 years average 11338 lbs. milk
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Dam's Dam's	,,	14533 lbs. milk	...	4 years average	12871 lbs. milk
Sire's Dam's	,,	10370 ,,	...	7 ,, ,,	9354 ,,
Sire's D. Dam's	,,	9510 ,,	...	12 ,, ,,	8033 ,,
G. Sire's D. Dam's	,,	10215 ,,	...	7 ,, ,,	9386 ,,
G.G. Sire's D. Dam's	,,	12565 ,,	...	10 ,, ,,	8853 ,,
G.G.G. Sire's D. Dam's	,,	10088 ,,	...	2 ,, ,,	9754 ,,

Inspection of the Herd is Invited.

Visitors will be met at the Station on notifying the Manager, State Research Farm, Werribee.

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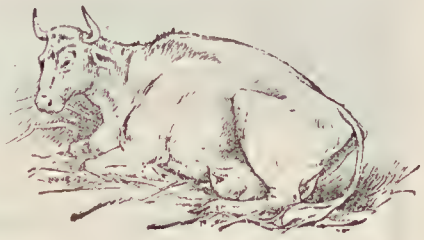

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Colour, Brown and White. *Calved 30th July, 1915*

Bred by Mr. W. P. Brisbane, Gowrie Park, Weerite, Victoria.

Pedigree.

Sire: Wallace of Gowrie Park (675) A.H.B. of A.
Dam: Princess of Gowrie Park (1710) by Heather of Jock 2nd (387)
2nd Dam: Princess 4th of Luminous of Oakbank (456)
3rd Dam: Young Princess by Dahlia's Adonis (172)
4th Dam: Princess by Young Norman (225)
5th Dam: Fancy by Earl of Seafield (422)
6th Dam: Princess by Norval.

Princess of Gowrie Park yielded 8,930¼ lbs. milk with a 4·67 test in 273 days.

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Colour, Brown and White. *Calved 24th September, 1917*

Bred by Department of Agriculture at the State Farm, Rutherglen.

Sire: Royal Prince of Gowrie Park by Wallace of Gowrie Park (675) A.H.B. of A.
Dam: Irene 2nd of Flinders by Glen Elgin's Combine.
2nd Dam: Irene of Flinders by Gleneira's Monsieur (546)
3rd Dam: Irene of Gleneira (1727) by Majestic of Oakbank (326)
4th Dam: Isabel of Gleneira (1036) by Red Chief (359)
5th Dam: Gaiety (1006) by Dainty Davie.
6th Dam: Princess (270) by Prince.

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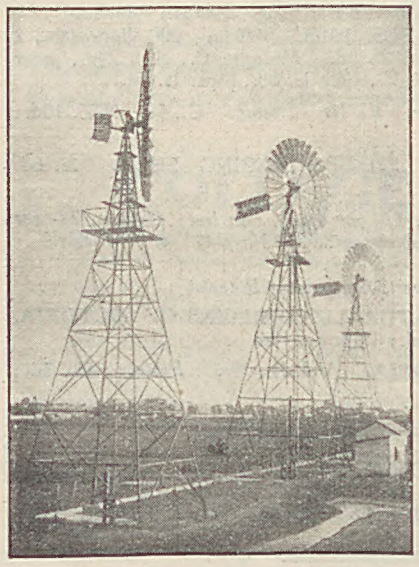

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